

JAPANESE [JP,2002-247634,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

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CLAIMS

[Claim(s)]

[Claim 1] In the connection method of the Internet telephone system which consists of a connection control unit which manages the positional information of the terminal in a zone, and an Internet telephone machine The 1st step which searches the location registration table of said connection control device based on the zone number of a partner terminal, The 2nd step which asks for the terminal address of said partner terminal from the location registration table for local station terminals when it judges with said partner terminal being an intra office terminal, The 3rd step which searches the location registration table for external terminals when it judges with said partner terminal being a terminal of other station hold, When the positional information of said partner terminal is registered into said location registration table for external terminals, The Internet telephone connection method characterized by having the 4th step which asks for the terminal address of said partner terminal from the positional information, and changing a partner terminal number into the terminal address using the location registration table of a connection control device.

[Claim 2] [when said location registration table for external terminals is searched with said 3rd step] The 5th step which asks for the terminal address of said connection control device in which said partner terminal is held based on the zone number of the connection control-device registration table of said connection control device, and said partner terminal when there is no positional information of said partner terminal, The Internet telephone connection method according to claim 1 characterized by having the 6th step which asks the terminal address of said partner terminal to said connection control unit.

[Claim 3] The Internet telephone connection method according to claim 1 characterized by to have the step which makes an invalid the terminal address concerned of said location-registration table for local-station terminals, the step which gives a location-registration demand to the connection control device of a migration place, and registers the terminal address concerned into said location-registration table for external terminals, and the step which notifies positional information to said connection control device of the local station of said terminal from said connection control device of a migration place when a terminal moves to other zones.

[Claim 4] The Internet telephone connection method according to claim 1 characterized by notifying the positional information of said connection control unit with which said connection control unit beforehand determined as the step which acquires the positional information of other connection control units from the connection control unit defined beforehand was established newly to other part or all connection control units when a connection control unit is established newly.

[Claim 5] The Internet telephone connection method according to claim 1 characterized by notifying that the positional information of said connection control device newly established by the multicast is the step which searches a neighboring connection control device by either the unicast or the multicast, and the step which acquires the positional information of other connection control devices from said neighboring connection control device to other part or all connection control devices when a connection control device is established newly.

[Claim 6] The 1st cordless telephone main phone which communicates by Internet Protocol, The

1st connection control unit which is connected to said 1st cordless telephone machine main phone and computer network, and manages the positional information of the cordless handset in the zone of said 1st cordless telephone machine main phone, The first-born child machine matched with said 1st connection control unit, and the 2nd cordless telephone main phone which communicates by Internet Protocol, The 2nd connection control unit which is connected to said 2nd cordless telephone machine main phone and said computer network, and manages the positional information of the cordless handset in the zone of said 2nd cordless telephone machine main phone, It has the second-born child machine matched with said 2nd connection control unit. Said 1st connection control unit and said 2nd connection control unit The table for connection control devices which memorizes the positional information of other connection control devices, respectively, The location registration table for local station terminals which memorizes the positional information of the cordless handset matched with the local station, When a call occurs from said first-born child machine to said second-born child machine including the location registration table for other station terminals which memorizes the positional information of the cordless handset which is not matched with a local station, said 1st connection control unit Based on the demand from said first-born child machine, said location registration table for local station terminals and said location registration table for other station terminals are searched. When the address of said second-born child machine is extracted, this is transmitted to said 1st cordless telephone machine main phone and the address of said second-born child machine is not able to be discovered When the address of said second-born child machine is required of said 2nd connection control unit and the address of said second-born child machine is received from said 2nd connection control unit, This is transmitted to said 1st cordless telephone main phone. Said 2nd connection control unit The Internet telephone system characterized by what said location registration table for local station terminals and said location registration table for other station terminals are searched based on the demand from said 1st connection control device, the address of said second-born child machine is extracted, and this is transmitted for to said 1st connection control device.

[Claim 7] Said 1st connection control unit is an Internet telephone system according to claim 6 characterized by judging said first-born child machine based on the identification information to be a local station terminal, and registering the address of said first-born child machine into said location registration table for local station terminals when a location registration demand is received from said first-born child machine.

[Claim 8] Said 1st connection control unit is an Internet telephone system according to claim 7 characterized by notifying location registration completion to said first-born child machine.

[Claim 9] When a location registration demand is received from said second-born child machine, while said 1st connection control unit judges said first-born child machine based on the identification information to be an other station terminal and registers the address of said second-born child machine into said location registration table for other station terminals The address of said second-born child machine in said 1st connection control unit is notified to said 2nd connection control unit. Said 2nd connection control unit The Internet telephone system according to claim 6 characterized by re-registering the address of said second-born child machine in said 1st connection control unit into said location registration table for local station terminals in response to the notice from said 1st connection control unit.

[Claim 10] Furthermore, it is the Internet telephone system according to claim 9 which said 2nd connection control unit performs the notice of a purport which re-registered the address of said second-born child machine to said 1st connection control unit, and is characterized by said 1st connection control unit notifying location registration completion to said second-born child machine in response to the notice of the re-registration from said 2nd connection control unit.

[Claim 11] When said second-born child machine leaves the zone of a local station, while said 1st connection control unit deletes the address of said second-born child machine from said location registration table for other station terminals The demand which deletes the address of said second-born child machine to said 2nd connection control unit is transmitted. Said 2nd connection control unit The Internet telephone system according to claim 9 characterized by deleting the address of said second-born child machine from said location registration table for

local station terminals in response to the address deletion demand of said second-born child machine.

[Claim 12] Said 1st connection control unit is an Internet telephone system according to claim 6 characterized by notifying message impossible to said first-born child machine when the address of said second-born child machine is not received from said 2nd connection control unit.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the connection method and system of the Internet cordless telephones system for communicating using Internet Protocol.

[0002]

[Description of the Prior Art] There is JP,2000-308128,A to indicate this kind of technique. A VoIP technique is used for this kind used from the former of system. The Internet network is the network world which transmits and receives data using IP protocol, and calls the technique of exchanging conversation using this IP network VoIP (Voiceover IP). In VoIP, voice is compressed, it is made packet data, an informer and a destination are identified for the address of the cosmopolitan called an IP address, and it transmits and receives using the Internet line network.

[0003] Many of conventional systems use H.323 which is the standard protocol of a VoIP technique, and it consists of H.323 terminal, a gatekeeper, a gateway unit, and a multi-point communication device (MCU). Among these, a gatekeeper is used for telephone number-IP address conversion.

[0004] In fundamental handshaking by such system, first, H.323 terminal inputs the number of a gateway unit, and connects it with a gateway unit. Subsequently, an input of the telephone number of a phase hand terminal performs telephone number-IP address conversion by the gatekeeper. And this gateway unit calls the gateway unit of a phase hand terminal, and the gateway unit of a phase hand terminal makes a connection application to the gatekeeper of a phase hand terminal. Here, if authorization comes out, a gateway unit sets up the connection between terminals, after that, the call between terminals will be performed and a connection will be established.

[0005] The above is a connection control procedure by the standard protocol H.323 on condition of first connection, and the voice communication of it which minded the Internet using the telephone number becomes possible.

[0006]

[Problem(s) to be Solved by the Invention] When it actually constitutes such a system, in the case of a large-scale network, the method which installs in a network the equipment NSP (network service control equipment) which has the gatekeeper ability which changes the telephone number into an IP address, and makes telephone number-IP address conversion and a connection application to this NSP is common.

[0007] However, since all communication links are performed through NSP while the facility costs in early stages of network become high since it is necessary to install NSP when applying such network configuration to the network where a place of business and an area are small-scale, while processing concentrates on NSP, there is a problem of a communication link becoming impossible at the time of failure of NSP.

[0008] The technical problem which this invention tends to solve installs NSP (network service control station) in a network in this way, and is to solve the trouble in the centralized control system which performs telephone number-IP address conversion and connection application

processing intensively.

[0009]

[Means for Solving the Problem] The Internet telephone connection method concerning this invention In the connection method of the Internet telephone system which consists of a connection control unit which manages the positional information of the terminal in a zone, and an Internet telephone machine The 1st step which searches the location registration table of said connection control device based on the zone number of a partner terminal, The 2nd step which asks for the terminal address of said partner terminal from the location registration table for local station terminals when it judges with said partner terminal being an intra office terminal, The 3rd step which searches the location registration table for external terminals when it judges with said partner terminal being a terminal of other station hold, When the positional information of said partner terminal is registered into said location registration table for external terminals, it has the 4th step which asks for the terminal address of said partner terminal from the positional information, and a partner terminal number is changed into the terminal address using the location registration table of a connection control device.

[0010] [when said location registration table for external terminals is preferably searched with said 3rd step] The 5th step which asks for the terminal address of said connection control device in which said partner terminal is held based on the zone number of the connection control-device registration table of said connection control device, and said partner terminal when there is no positional information of said partner terminal, It has the 6th step which asks the terminal address of said partner terminal to said connection control unit.

[0011] Preferably, when a terminal moves to other zones; it has the step which makes an invalid the terminal address concerned of said location registration table for local station terminals, the step which gives a location registration demand to the connection control device of a migration place, and registers the terminal address concerned into said location registration table for external terminals, and the step which notifies positional information to said connection control device of the local station of said terminal from said connection control device of a migration place.

[0012] Preferably, when a connection control unit is established newly, the positional information of said connection control unit with which said connection control unit beforehand determined as the step which acquires the positional information of other connection control units from the connection control unit defined beforehand was established newly is notified to other part or all connection control units.

[0013] Preferably, when a connection control device is established newly, it is notified to other part or all connection control devices that the positional information of said connection control device newly established by the multicast is the step which searches a neighboring connection control device by either the unicast or the multicast, and the step which acquires the positional information of other connection control devices from said neighboring connection control device.

[0014] This invention installs the connection control unit which performs telephone number-IP address conversion and connection application processing per one floor or two or more floors (this kind of predetermined field is hereafter called a "zone") instead of one set of NSP prepared in a network. There are comparatively few the numbers of zones and the numbers of terminals which this kind of connection control unit treats, they are possible also for mounting to a personal computer etc., and can be realized cheaply.

[0015] The description of this method is in the point of using the dispersed control system as network administration, and the connection control unit which performs telephone number-IP address conversion and connection application processing is installed in each zone. Between connection control units, positional information required for the communication link with the terminal of other zones communicates, and is acquired. Moreover, when a terminal moves to other zones, while registering positional information into the connection control unit of the zone of a migration place, positional information is notified also to the connection control unit of a self-zone. Thereby, the positional information of the terminal which the connection control unit of a self-zone and the connection control unit of a migration place moved can be held. For this

reason, communication between connection control units can be omitted in the communication link to the terminal which moved, and connection processing can be simplified.

[0016] When establishing a new zone newly, it is necessary to establish a connection control device newly but, and while acquiring the positional information of the connection control device which already exists in a network from the connection control device which this connection control device discovered the connection control device of an adjoining zone by the multicast, and was discovered at this time, its positional information is notified to other connection control devices. Thereby, when the terminal of an establishment zone communicates with the terminal of other zones, the connection control unit of an establishment zone can know the positional information of the connection control unit of other zones from the zone number contained in a partner terminal number, and the acquired connection control unit positional information. The terminal of an establishment zone becomes possible [communicating with the terminal of other zones] from this connection control unit by getting to know the positional information of a partner terminal. By the same approach, when the connection control unit of this zone receives the notice of positional information from the connection control unit of an establishment zone, the terminal of an established zone acquires the positional information of the terminal of an establishment zone, and becomes possible [communicating with the terminal of an establishment zone].

[0017] When a new zone is established newly, while a new connection control unit communicates with the connection control unit defined beforehand and acquires the positional information of all the connection control units of an established zone apart from the above-mentioned method, the connection control unit defined beforehand can enable communication of the terminal of an establishment zone, and the terminal of an established zone by notifying the positional information of a new connection control unit to an established connection control unit.

[0018] The Internet telephone system concerning this invention The 1st cordless telephone main phone which communicates by Internet Protocol, The 1st connection control unit which is connected to said 1st cordless telephone machine main phone and computer network, and manages the positional information of the cordless handset in the zone of said 1st cordless telephone machine main phone, The first-born child machine matched with said 1st connection control unit, and the 2nd cordless telephone main phone which communicates by Internet Protocol, The 2nd connection control unit which is connected to said 2nd cordless telephone machine main phone and said computer network, and manages the positional information of the cordless handset in the zone of said 2nd cordless telephone machine main phone, It has the second-born child machine matched with said 2nd connection control unit. Said 1st connection control unit and said 2nd connection control unit The table for connection control devices which memorizes the positional information of other connection control devices, respectively, The location registration table for local station terminals which memorizes the positional information of the cordless handset matched with the local station, When a call occurs from said first-born child machine to said second-born child machine including the location registration table for other station terminals which memorizes the positional information of the cordless handset which is not matched with a local station, said 1st connection control unit Based on the demand from said first-born child machine, said location registration table for local station terminals and said location registration table for other station terminals are searched. When the address of said second-born child machine is extracted, this is transmitted to said 1st cordless telephone machine main phone and the address of said second-born child machine is not able to be discovered When the address of said second-born child machine is required of said 2nd connection control unit and the address of said second-born child machine is received from said 2nd connection control unit, This is transmitted to said 1st cordless telephone machine main phone. Said 2nd connection control unit Based on the demand from said 1st connection control device, said location registration table for local station terminals and said location registration table for other station terminals are searched, the address of said second-born child machine is extracted, and this is transmitted to said 1st connection control device.

[0019] Preferably, when a location registration demand is received from said first-born child machine, said 1st connection control unit judges said first-born child machine based on the

identification information to be a local station terminal, and registers the address of said first-born child machine into said location registration table for local station terminals.

[0020] Preferably, said 1st connection control unit notifies location registration completion to said first-born child machine.

[0021] When said 1st connection control unit receives a location registration demand from said second-born child machine preferably, While judging said first-born child machine based on the identification information to be an other station terminal and registering the address of said second-born child machine into said location registration table for other station terminals The address of said second-born child machine in said 1st connection control unit is notified to said 2nd connection control unit. Said 2nd connection control unit In response to the notice from said 1st connection control unit, the address of said second-born child machine in said 1st connection control unit is re-registered into said location registration table for local station terminals.

[0022] Preferably, further, said 2nd connection control unit performs the notice of a purport which re-registered the address of said second-born child machine to said 1st connection control unit, and said 1st connection control unit notifies location registration completion to said second-born child machine in response to the notice of the re-registration from said 2nd connection control unit.

[0023] Preferably, when said second-born child machine leaves the zone of a local station, while said 1st connection control unit deletes the address of said second-born child machine from said location registration table for other station terminals Transmitting the demand which deletes the address of said second-born child machine to said 2nd connection control unit, said 2nd connection control unit deletes the address of said second-born child machine from said location registration table for local station terminals in response to the address deletion demand of said second-born child machine.

[0024] Preferably, said 1st connection control unit notifies message impossible to said first-born child machine, when the address of said second-born child machine is not received from said 2nd connection control unit.

[0025]

[Embodiment of the Invention] Hereafter, the gestalt of implementation of this invention is concretely explained using drawing. A fundamental system configuration is explained using drawing 1 . This system constitutes one zone 5 with two or more Internet telephone machines 1 (Following PT and brief sketch) and connection control units 3 (it may outline Following PPX). An Internet telephone machine consists of a cordless handset 1 and a main phone 2 (BS), a cordless handset 1 and a main phone 2 are connected with a wireless interface, and a main phone 2 is connected with LAN/WAN4. A main phone 2 is connected with the connection control unit 3 through the hub or router which is not illustrated. In this case, the communications protocol used is the Internet Protocol of TCP/IP. It connects using the Internet or the usual wireless interface between zones 5.

[0026] the example of drawing 1 -- cordless handsets 1a and 1b -- the inside of the area of main phone 2a -- being located -- a cordless handset -- 1c is located in the area of main phone 2b. Main phone 2a is connected to PPX3a, and main phone 2b is connected to PPX3b. cordless handsets 1a and 1b -- respectively -- main phone 2a, PPX3a, LAN/WAN4, PPX3b, and main phone 2b -- leading -- a cordless handset -- it can telephone to 1c. If a cordless handset 1 is in one of the area 5 when the cordless handset 1 and the main phone 2 are connected on radio like this system, it can telephone to other cordless handsets 1 through the main phone 2. for example, drawing 1 -- a cordless handset -- the time of 1b moving to area 5b -- there -- a cordless handset -- 1b -- other cordless handsets -- it can telephone to 1a. For that purpose, while PPX3 detects the cordless handset 1 having moved in area and having gone into other area, that must be notified to other PPX3. About a protocol for that, it mentions later.

[0027] Next, the detailed procedure of a communication procedure is described on the assumption that the fundamental system of drawing 1 . First, a setup of a cordless handset (PT) 1 must be performed as a premise. ID is set up as an initialization item of PT1. This ID is used when PPX3 attests PT1. About an authentication procedure, although the existing procedure of

using a password is assumed, the detail is omitted here. the main phone 2 (Following BS and a brief sketch — there are things) of PT1 acquires the terminal address of LAN4 which a main phone 2 connects to others, a subnet mask, and a broadcast address from a router with protocols, such as DHCP.

[0028] As an initialization item of PPX3, ID, the terminal address of PPX3, a subnet mask, and a broadcast address are set up. The purpose and acquisition approach are the same as that of PT1. However, ID of PPX3 is used for authentication between PPX3. The table for PPX which manages the positional information of PPX, the location registration table for local station terminals which manages the positional information of a terminal, and the location registration table for external terminals are further prepared in PPX3. In addition, when BS2 has two or more terminal addresses, BS-terminal address administration table is set as PPX3.

[0029] It becomes unnecessary thus, to prepare NSP by preparing the table for PPX, the location registration table for local station terminals, and the location registration table for external terminals in PPX.

[0030] While telling that PT exists in the zone by location registration demand to PPX which manages the zone PT recognizes [a zone] current existence, the IP address of the PT is made to register into the location registration table for terminals. When the PT is the terminal of a local station zone for said PPX, the IP address of the PT is registered into the location registration table for local station terminals, and when the PT is the terminal of an other station zone, the IP address of the PT is registered into the location registration table for other station terminals. It is judged by ID of PT whether PT is the terminal of a local station zone, or it is the terminal of an other station zone. When PT moves to an other station zone and is registered into the location registration table for other station terminals of PPX of an other station, the IP address of PT in PPX of said other station is notified to PPX of a local station, and the location registration table for local station terminals of PPX is registered. This procedure is explained in full detail behind.

[0031] PPX to which PT manages first the zone in which a current it is located when PT communicates with other PTs — receiving — being concerned — others — the IP address of PT is required. the PPX — its own location registration table for local station terminals, and the location registration table for external terminals — searching — being concerned — others — when the IP address of PT is discovered, the IP address is transmitted to said PT. PPX of others [PPX / the] when it is not able to discover — being concerned — others — the IP address of PT is required. The PPX transmits the IP address received from other PPX(s) to said PT.

[0032] 1. He must be registered into PPX3 in order for the location registration procedure PT 1 to telephone to other PTs1. Drawing 2 R> 2 explains a location registration procedure. A user (User) 1 switches on the power source of PT1a (S1). PT1a performs the notice of connection to BS2a (S2). PT1a performs the location registration demand to the PPP connection between PT1a and PPX3a (S4). At this time, PT1a is taken as an outside-of-the-circle display to User1 (S3). From the zone number in ID, PPX3a judges it as a self-zone terminal, and registers the terminal address into the location registration table for local station terminals (S5). A location registration response is returned to PT1a after registration termination (S6). PT1a which received this response is taken as a display within the circle to User1 (S7). [0033] 2. Drawing 3 explains the communication procedure in the communication procedure self-zone in a self-zone. User1 is off-hook in PT1a (Off Hook) — carrying out (S10) — PT1a passes the two sound which shows communication link **** (S11). User1 — ID (zone number + extension number) of PT1b of a communications partner — PT1a — dialing (S12) — the two sound of PT1a stops (S13). PT1a transmits the terminal address demand of PT1b to PPX3a after checking un-using [of BS2a] (S14) (S15). From the zone number in ID, PPX3a searches the location registration table for local station terminals (S16), and returns the terminal address to PT1a (S17). PT1a which received this is called to PT1b, and transmits a demand (S18). PT1b checks un-using [of BS2b] (S19), if unused, will be called to PT1a and will return response 1 (S20). Furthermore, it calls to User2 and a sound is transmitted (S22). Moreover, PT1a which received the call response 1 passes a call sound (S21). If User2 which has noticed the call sound carries out arrival-of-the-

mail actuation (S23), PT1b will release voice pass and will go into a communication link condition while it calls and sends response 2 to PT1a (S24) (S25, S26).

[0034] 3. Drawing 4 explains a communication procedure with the terminal of a zone besides a communication procedure with the terminal of other zones. User1 is off-hook in PT1a (Off Hook) — carrying out (S30) — PT1a passes from an earphone the two sound which shows communication link **** (S31). If User1 dials ID of PT1c of a communications partner to PT1a (S32), a two sound will stop (S33). PT1a transmits the terminal address demand of PT1c to PPX3a (local station of PT1a) after checking un-using [of BS2a] (S34) (S35). From the zone number in ID, PPX3a judges that PT1c of a communications partner is the terminal of other zones, and searches the location registration table for external terminals (S36). When the terminal address is registered into the location registration table for external terminals, the terminal address of PT1c is returned as a reply signal to PT1a (S38). When not registered, the location registration table of PPX is searched using the zone number in a dial, it asks for the address of PPX3c, and the terminal address of PT1c is asked to PPX3c (S37). From the zone number within an inquiry signal, PPX3c searches the location registration table for local station terminals (S39), and returns the terminal address of PT1c to PPX3a (S40). PPX3a which received the terminal address of PPX3c to PT1c returns the terminal address of PT1c to PT1a (S41). PT1a which received the terminal address of PT1c is called to PT1c, and transmits a demand (42). PT1c checks un-using [of BS2c] (S43), if unused, will be called to PT1a and will return response 1 (S44). Furthermore, it calls to User 2 and a sound is passed (S45). If User2 which has noticed the call sound carries out arrival-of-the-mail actuation (S47), PT1c will release voice pass and will go into a communication link condition while it calls and sends response 2 to PT1a (S48) (S49, S50).

[0035] 4. A partner explains a communication procedure in case the terminal of the communication procedure self-zone at the time of the outside of the circle and power off is the outside of the circle or power off by drawing 5. User1 operates PT1a, and when a communication link demand is performed to PT1b of the self-zone used as the outside of the circle or power off (S51 thru/or S54, S55); PT1a transmits the terminal address demand of PT1b to PPX3a (S56). PPX3a searches the location registration table for local station terminals from the zone number within a demand signal (S57). However, when PT1b is already the outside of the circle or power off, the terminal address is deleted from the location registration table for local station terminals. Therefore, PPX3a cannot find the terminal address of PT1b. At this time, PPX3a returns the terminal field in a terminal address response as 0 to PT1a (S57, S58). PT1a which received this reply signal judges that a communication link is more nearly impossible than the value of the terminal field (S59), and shows a communication link impossible display to User1 (S60).

[0036] 5. Drawing 6 explains the location registration procedure at the time of zone migration besides the location registration procedure at the time of other zone migration. When User 1 holding PT1 moves out of a zone, PT1 detects the wireless line disconnection of a PPX3a zone (S61), and performs an outside-of-the-circle display to User 1 (S63). PPX3a will set PT1 terminal address of the location registration table for local station terminals to 0 after fixed time amount, if cutting of a wireless circuit with PT1 is notified from BS2 (S61) (S62). PT1 which moved to the zone of PPX3b makes PPP connection to PPX3b (S64), transmits ID of the newly acquired terminal address and PT1 to PPX3b, and performs a location registration demand (S65). PPX3b registers positional information into the location registration table for external terminals from the zone number in ID transmitted from PT1 (S66). PPX3b is ID of PT1. With reference to the table for PPX, it asks for the address of PPX3a based on an inner zone number, and the location registration information on PT1 is transmitted to PPX3a (S67). PPX3a — the positional information of PT1 — the location registration table for local station terminals — registering (S68) — a location registration response is returned to PPX3b (S69). And PPX3b returns a location registration response to PT1 (S70). PT1 which received the location registration response from PPX3b shows a display within the circle to User 1 (S71).

[0037] 6. Location Registration Procedure at Time of Other Zone Migration (Multiplex Migration) Drawing 7 explains the location registration procedure at the time of the multiplex migration

which PT1 which moved to other zones moves to the zone of further others. In drawing 7, User1 shall move to a PPX3c zone (not shown in drawing 1) from a PPX3b zone. PT1 will perform an outside-of-the-circle display to User 1, if the wireless line disconnection of a PPX3b zone is detected (S72) (S73). if PPX3b is notified from BS for which cutting of a wireless circuit with PT1 was using PT1 (S74) — fixed time amount after — PT1 terminal address of the location registration table for external terminals — deleting (S75) — with reference to the table for PPX, a location registration deletion demand is transmitted to PPX3a (S76). In PPX3a, after setting the terminal address of PT1 of the location registration table for local station terminals to 0 (S77), a location registration deletion response is returned to PPX3b (S78). PT1 which moved to the zone of PPX3c makes PPP connection to PPX3c (S79), transmits ID of the newly acquired terminal address and PT1 to PPX3c, and performs a location registration demand (S81). PPX3c registers positional information into the location registration table for external terminals with the zone number in ID transmitted from PT1 (S82). PPX3c is ID of PT1. With reference to the table for PPX, it asks for the address of PPX1 based on an inner zone number, and the location registration information on PT1 is transmitted to PPX3a (S83). PPX3a registers the positional information of PT1 into the location registration table for local station terminals (S84), a location registration response is returned to PPX3c (S85), and PPX3c returns a location registration response to PT1 (S86). PT1 which received the location registration response from PPX3c shows a display within the circle to User 1 (S87).

[0038] 7. Communication Procedure after Other Zone Migration (Inside of Migration Place Zone) Drawing 8 explains the communication procedure in the migration zone after other zone migration. If Off Hook [User1 / PT1a] (S90), PT1 will pass the two sound which shows communication link **** (S91). If User1 dials ID of PT1b of a communications partner to PT1a (S92), PT1a will stop a two sound (S93). PT1a transmits the terminal address demand of PT1b to PPX2b after checking un-using [of BS2-a] (S94) (S95). From the zone number in ID, PPX2b searches the location registration table for local station terminals (S96), and returns the terminal address to PT1a (S97). PT1a which received this is called to PT1b, and transmits a demand (S98). In PT1b, it checks un-using [of BS2-b] (S99), and if unused, it will call to PT1a and response 1 will be returned (S100). Furthermore, it calls to User 2 and a sound is transmitted (S102). Moreover, PT1a which received the call response 1 passes a call sound (S101). If arrival-of-the-mail actuation is carried out with a call sound (S103), User 2 will open voice pass wide and will go into a communication link condition (S104 thru/or S106).

[0039] 8. Drawing 9 explains the procedure in the case of communicating with the terminal of still more nearly another zone after zone migration besides a communication procedure with the other zone terminal at the time of other zone migration. If Off Hook [User1 / PT1a] (S110), the two sound which shows communication link **** will be passed (S111). If User1 dials ID of PT1c of a communications partner to PT1 (S111), a two sound will stop (S113). PT1a transmits the terminal address demand of PT1c to PPX3b after checking un-using [of BS2a] (S114) (S115). PT1c of a communications partner judges PPX3b to be the terminal of other zones from the zone number in ID, and the location registration table for external terminals is searched (S116). When the terminal address is registered into the location registration table for external terminals, the terminal address of PT1c is returned as a reply signal to PT1a (S117). When not registered, a PPX location registration table is searched using the zone number in a dial, it asks for the address of PPX3c, and the terminal address of PT1c is asked to PPX3c (S118). From the zone number within an inquiry signal, PPX3c searches the location registration table for local station terminals (S119), and returns a response for the terminal address of PT1c to PPX3b (S120). PPX3b which received the terminal address of PPX3c to PT1c returns the terminal address of PT1c to PT1a (S121). PT1a which received the terminal address of PT1c is called to PT1c, and transmits a demand (S122). PT1c is PT1a, if it checks un-using [of BS3c] (S123) and is unused. It calls and response 1 is returned (S124). Furthermore, it calls to User 3 and a sound is transmitted (S126). Moreover, PT1a which received the call response 1 passes a call sound (S125). If arrival-of-the-mail actuation is carried out with a call sound (S127), User 3 will open voice pass wide and will go into a communication link condition (S128 thru/or S130).

[0040] 9. Positional Information Update Process at Time of PPX New Addition (when Using

Connection Control Unit (henceforth Management Center) Defined Beforehand)

Drawing 10 explains the acquisition approach of a zone number when PPX is newly established by the addition of a new zone, and the approach of notifying the positional information of newly established PPX to other PPX(s). This drawing shows a procedure in case there is a management center. If new PPX acquires the IP address of a management center by the approach defined beforehand, a zone number will be required of a management center (S200). a management center — zone management information — referring to — an intact zone number — assigning (S201) — a zone number and a PPX address-mapping table are updated (S202), and a zone number is notified to Establishment PPX (S203). A management center notifies the positional information of Establishment PPX by the multicast or unicast communication link to established PPX, and updates PPX positional information (S204 thru/or S208).

[0041] 10. Positional Information Update Process at the Time of PPX New Addition (when Not Using Management Center)

Next, drawing 11 explains the procedure about the zone number acquisition approach of Establishment PPX when not using a management center, and the method of notifying other PPX (s) of the positional information of Establishment PPX. Establishment PPX collects the positional information of Existing PPX by multicast communication link (S300 thru/or S302). Based on the positional information (S303) (modification-PX positional information is returned to below for description of drawing) of established PPX, the positional information of self-PPX is created for an intact zone number as a zone number of self-PPX (S305). Establishment PPX notifies the created positional information by the multicast or unicast communication link to established PPX (S306, S307). Established PPX updates PPX positional information using this positional information (S308).

[0042] Various modification is possible for this invention within the limits of invention indicated by the claim, without being limited to the gestalt of the above operation, and it cannot be overemphasized that it is that by which they are also included within the limits of this invention.

[0043] Moreover, in this specification, a means does not necessarily mean a physical means, and the function of each means includes, also when software realizes. Furthermore, even if the function of one means is realized by two or more physical means, the function of two or more means may be realized by one physical means.

[0044]

[Effect of the Invention] As mentioned above, by acquiring, when the connection control unit installed for every zone in the positional information of a terminal exchanges the positional information of a terminal mutually, and performing conversion of a terminal number and the terminal address, as explained to the detail, even when a terminal moves to other zones, by this invention, sending and receiving become possible using the same terminal number. Moreover, it is not necessary to install NSP (network service control equipment), and the communication link in a zone and between a zone is attained only by installing a connection control unit for every zone. Therefore, facility cost can be held down when building networks where a scale is comparatively small, such as a place of business and an area, if this invention is used. Moreover, the problem that a network communication link stops service by failure of NSP is avoidable.

[0045] Moreover, in this invention, even when a zone is established newly and a network scale is expanded, renewal of the positional information between contacts is attained, and becomes possible [guaranteeing network scalability].

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the connection method and system of the Internet cordless telephones system for communicating using Internet Protocol.

[Translation done.]

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PRIOR ART

[Description of the Prior Art] There is JP,2000-308128,A to indicate this kind of technique. A VoIP technique is used for this kind used from the former of system. The Internet network is the network world which transmits and receives data using IP protocol, and calls the technique of exchanging conversation using this IP network VoIP (Voiceover IP). In VoIP, voice is compressed, it is made packet data, an informer and a destination are identified for the address of the cosmopolitan called an IP address, and it transmits and receives using the Internet line network.

[0003] Many of conventional systems use H.323 which is the standard protocol of a VoIP technique, and it consists of H.323 terminal, a gatekeeper, a gateway unit, and a multi-point communication device (MCU). Among these, a gatekeeper is used for telephone number-IP address conversion.

[0004] In fundamental handshaking by such system, first, H.323 terminal inputs the number of a gateway unit, and connects it with a gateway unit. Subsequently, an input of the telephone number of a phase hand terminal performs telephone number-IP address conversion by the gatekeeper. And this gateway unit calls the gateway unit of a phase hand terminal, and the gateway unit of a phase hand terminal makes a connection application to the gatekeeper of a phase hand terminal. Here, if authorization comes out, a gateway unit sets up the connection between terminals, after that, the call between terminals will be performed and a connection will be established.

[0005] The above is a connection control procedure by the standard protocol H.323 on condition of first connection, and the voice communication of it which minded the Internet using the telephone number becomes possible.

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EFFECT OF THE INVENTION

[Effect of the Invention] As mentioned above, by acquiring, when the connection control unit installed for every zone in the positional information of a terminal exchanges the positional information of a terminal mutually, and performing conversion of a terminal number and the terminal address, as explained to the detail, even when a terminal moves to other zones, by this invention, sending and receiving become possible using the same terminal number. Moreover, it is not necessary to install NSP (network service control equipment), and the communication link in a zone and between a zone is attained only by installing a connection control unit for every zone. Therefore, facility cost can be held down when building networks where a scale is comparatively small, such as a place of business and an area, if this invention is used. Moreover, the problem that a network communication link stops service by failure of NSP is avoidable.

[0045] Moreover, in this invention, even when a zone is established newly and a network scale is expanded, renewal of the positional information between contacts is attained, and becomes possible [guaranteeing network scalability].

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] When it actually constitutes such a system, in the case of a large-scale network, the method which installs in a network the equipment NSP (network service control equipment) which has the gatekeeper ability which changes the telephone number into an IP address, and makes telephone number-IP address conversion and a connection application to this NSP is common.

[0007] However, since all communication links are performed through NSP while the facility costs in early stages of network become high since it is necessary to install NSP when applying such network configuration to the network where a place of business and an area are small-scale, while processing concentrates on NSP, there is a problem of a communication link becoming impossible at the time of failure of NSP.

[0008] The technical problem which this invention tends to solve installs NSP (network service control station) in a network in this way, and is to solve the trouble in the centralized control system which performs telephone number-IP address conversion and connection application processing intensively.

[Translation done.]

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MEANS

[Means for Solving the Problem] The Internet telephone connection method concerning this invention In the connection method of the Internet telephone system which consists of a connection control unit which manages the positional information of the terminal in a zone, and an Internet telephone machine The 1st step which searches the location registration table of said connection control device based on the zone number of a partner terminal, The 2nd step which asks for the terminal address of said partner terminal from the location registration table for local station terminals when it judges with said partner terminal being an intra office terminal, The 3rd step which searches the location registration table for external terminals when it judges with said partner terminal being a terminal of other station hold, When the positional information of said partner terminal is registered into said location registration table for external terminals, it has the 4th step which asks for the terminal address of said partner terminal from the positional information, and a partner terminal number is changed into the terminal address using the location registration table of a connection control device.

[0010] [when said location registration table for external terminals is preferably searched with said 3rd step] The 5th step which asks for the terminal address of said connection control device in which said partner terminal is held based on the zone number of the connection control-device registration table of said connection control device, and said partner terminal when there is no positional information of said partner terminal, It has the 6th step which asks the terminal address of said partner terminal to said connection control unit.

[0011] Preferably, when a terminal moves to other zones, it has the step which makes an invalid the terminal address concerned of said location registration table for local station terminals, the step which gives a location registration demand to the connection control device of a migration place, and registers the terminal address concerned into said location registration table for external terminals, and the step which notifies positional information to said connection control device of the local station of said terminal from said connection control device of a migration place.

[0012] Preferably, when a connection control unit is established newly, the positional information of said connection control unit with which said connection control unit beforehand determined as the step which acquires the positional information of other connection control units from the connection control unit defined beforehand was established newly is notified to other part or all connection control units.

[0013] Preferably, when a connection control device is established newly, it is notified to other part or all connection control devices that the positional information of said connection control device newly established by the multicast is the step which searches a neighboring connection control device by either the unicast or the multicast, and the step which acquires the positional information of other connection control devices from said neighboring connection control device.

[0014] This invention installs the connection control unit which performs telephone number-IP address conversion and connection application processing per one floor or two or more floors (this kind of predetermined field is hereafter called a "zone") instead of one set of NSP prepared in a network. There are comparatively few the numbers of zones and the numbers of terminals

which this kind of connection control unit treats, they are possible also for mounting to a personal computer etc., and can be realized cheaply.

[0015] The description of this method is in the point of using the dispersed control system as network administration, and the connection control unit which performs telephone number-IP address conversion and connection application processing is installed in each zone. Between connection control units, positional information required for the communication link with the terminal of other zones communicates, and is acquired. Moreover, when a terminal moves to other zones, while registering positional information into the connection control unit of the zone of a migration place, positional information is notified also to the connection control unit of a self-zone. Thereby, the positional information of the terminal which the connection control unit of a self-zone and the connection control unit of a migration place moved can be held. For this reason, communication between connection control units can be omitted in the communication link to the terminal which moved, and connection processing can be simplified.

[0016] When establishing a new zone newly, it is necessary to establish a connection control device newly but, and while acquiring the positional information of the connection control device which already exists in a network from the connection control device which this connection control device discovered the connection control device of an adjoining zone by the multicast, and was discovered at this time, its positional information is notified to other connection control devices. Thereby, when the terminal of an establishment zone communicates with the terminal of other zones, the connection control unit of an establishment zone can know the positional information of the connection control unit of other zones from the zone number contained in a partner terminal number, and the acquired connection control unit positional information. The terminal of an establishment zone becomes possible [communicating with the terminal of other zones] from this connection control unit by getting to know the positional information of a partner terminal. By the same approach, when the connection control unit of this zone receives the notice of positional information from the connection control unit of an establishment zone, the terminal of an established zone acquires the positional information of the terminal of an establishment zone, and becomes possible [communicating with the terminal of an establishment zone].

[0017] When a new zone is established newly, while a new connection control unit communicates with the connection control unit defined beforehand and acquires the positional information of all the connection control units of an established zone apart from the above-mentioned method, the connection control unit defined beforehand can enable communication of the terminal of an establishment zone, and the terminal of an established zone by notifying the positional information of a new connection control unit to an established connection control unit.

[0018] The Internet telephone system concerning this invention The 1st cordless telephone main phone which communicates by Internet Protocol, The 1st connection control unit which is connected to said 1st cordless telephone machine main phone and computer network, and manages the positional information of the cordless handset in the zone of said 1st cordless telephone machine main phone, The first-born child machine matched with said 1st connection control unit, and the 2nd cordless telephone main phone which communicates by Internet Protocol, The 2nd connection control unit which is connected to said 2nd cordless telephone machine main phone and said computer network, and manages the positional information of the cordless handset in the zone of said 2nd cordless telephone machine main phone, It has the second-born child machine matched with said 2nd connection control unit. Said 1st connection control unit and said 2nd connection control unit The table for connection control devices which memorizes the positional information of other connection control devices, respectively, The location registration table for local station terminals which memorizes the positional information of the cordless handset matched with the local station, When a call occurs from said first-born child machine to said second-born child machine including the location registration table for other station terminals which memorizes the positional information of the cordless handset which is not matched with a local station, said 1st connection control unit Based on the demand from said first-born child machine, said location registration table for local station terminals and said location registration table for other station terminals are searched. When the address of said

second-born child machine is extracted, this is transmitted to said 1st cordless telephone machine main phone and the address of said second-born child machine is not able to be discovered. When the address of said second-born child machine is required of said 2nd connection control unit and the address of said second-born child machine is received from said 2nd connection control unit, this is transmitted to said 1st cordless telephone machine main phone. Said 2nd connection control unit. Based on the demand from said 1st connection control device, said location registration table for local station terminals and said location registration table for other station terminals are searched, the address of said second-born child machine is extracted, and this is transmitted to said 1st connection control device.

[0019] Preferably, when a location registration demand is received from said first-born child machine, said 1st connection control unit judges said first-born child machine based on the identification information to be a local station terminal, and registers the address of said first-born child machine into said location registration table for local station terminals.

[0020] Preferably, said 1st connection control unit notifies location registration completion to said first-born child machine.

[0021] When said 1st connection control unit receives a location registration demand from said second-born child machine preferably, while judging said first-born child machine based on the identification information to be an other station terminal and registering the address of said second-born child machine into said location registration table for other station terminals. The address of said second-born child machine in said 1st connection control unit is notified to said 2nd connection control unit. Said 2nd connection control unit. In response to the notice from said 1st connection control unit, the address of said second-born child machine in said 1st connection control unit is re-registered into said location registration table for local station terminals.

[0022] Preferably, further, said 2nd connection control unit performs the notice of a purport which re-registered the address of said second-born child machine to said 1st connection control unit, and said 1st connection control unit notifies location registration completion to said second-born child machine in response to the notice of the re-registration from said 2nd connection control unit.

[0023] Preferably, when said second-born child machine leaves the zone of a local station, while said 1st connection control unit deletes the address of said second-born child machine from said location registration table for other station terminals. Transmitting the demand which deletes the address of said second-born child machine to said 2nd connection control unit, said 2nd connection control unit deletes the address of said second-born child machine from said location registration table for local station terminals in response to the address deletion demand of said second-born child machine.

[0024] Preferably, said 1st connection control unit notifies message impossible to said first-born child machine, when the address of said second-born child machine is not received from said 2nd connection control unit.

[0025]

[Embodiment of the Invention] Hereafter, the gestalt of implementation of this invention is concretely explained using drawing. A fundamental system configuration is explained using drawing 1. This system constitutes one zone 5 with two or more Internet telephone machines 1 (Following PT and brief sketch) and connection control units 3 (it may outline Following PPX). An Internet telephone machine consists of a cordless handset 1 and a main phone 2 (BS), a cordless handset 1 and a main phone 2 are connected with a wireless interface, and a main phone 2 is connected with LAN/WAN4. A main phone 2 is connected with the connection control unit 3 through the hub or router which is not illustrated. In this case, the communications protocol used is the Internet Protocol of TCP/IP. It connects using the Internet or the usual wireless interface between zones 5.

[0026] the example of drawing 1 -- cordless handsets 1a and 1b -- the inside of the area of main phone 2a -- being located -- a cordless handset -- 1c is located in the area of main phone 2b. Main phone 2a is connected to PPX3a, and main phone 2b is connected to PPX3b. cordless handsets 1a and 1b -- respectively -- main phone 2a, PPX3a, LAN/WAN4, PPX3b, and main

phone 2b — leading — a cordless handset — it can telephone to 1c. If a cordless handset 1 is in one of the area 5 when the cordless handset 1 and the main phone 2 are connected on radio like this system, it can telephone to other cordless handsets 1 through the main phone 2. for example, drawing 1 — a cordless handset — the time of 1b moving to area 5b — there — a cordless handset — 1b — other cordless handsets — it can telephone to 1a. For that purpose, while PPX3 detects the cordless handset 1 having moved in area and having gone into other area, that must be notified to other PPX3. About a protocol for that, it mentions later.

[0027] Next, the detailed procedure of a communication procedure is described on the assumption that the fundamental system of drawing 1. First, a setup of a cordless handset (PT) 1 must be performed as a premise. ID is set up as an initialization item of PT1. This ID is used when PPX3 attests PT1. About an authentication procedure, although the existing procedure of using a password is assumed, the detail is omitted here. the main phone 2 (Following BS and a brief sketch — there are things) of PT1 acquires the terminal address of LAN4 which a main phone 2 connects to others, a subnet mask, and a broadcast address from a router with protocols, such as DHCP.

[0028] As an initialization item of PPX3, ID, the terminal address of PPX3, a subnet mask, and a broadcast address are set up. The purpose and acquisition approach are the same as that of PT1. However, ID of PPX3 is used for authentication between PPX3. The table for PPX which manages the positional information of PPX, the location registration table for local station terminals which manages the positional information of a terminal, and the location registration table for external terminals are further prepared in PPX3. In addition, when BS2 has two or more terminal addresses, BS-terminal address administration table is set as PPX3.

[0029] It becomes unnecessary thus, to prepare NSP by preparing the table for PPX, the location registration table for local station terminals, and the location registration table for external terminals in PPX.

[0030] While telling that PT exists in the zone by location registration demand to PPX which manages the zone PT recognizes [a zone] current existence, the IP address of the PT is made to register into the location registration table for terminals. When the PT is the terminal of a local station zone for said PPX, the IP address of the PT is registered into the location registration table for local station terminals, and when the PT is the terminal of an other station zone, the IP address of the PT is registered into the location registration table for other station terminals. It is judged by ID of PT whether PT is the terminal of a local station zone, or it is the terminal of an other station zone. When PT moves to an other station zone and is registered into the location registration table for other station terminals of PPX of an other station, the IP address of PT in PPX of said other station is notified to PPX of a local station, and the location registration table for local station terminals of PPX is registered. This procedure is explained in full detail behind.

[0031] PPX to which PT manages first the zone in which a current it is located when PT communicates with other PTs — receiving — being concerned — others — the IP address of PT is required. the PPX — its own location registration table for local station terminals, and the location registration table for external terminals — searching — being concerned — others — when the IP address of PT is discovered, the IP address is transmitted to said PT. PPX of others [PPX / the] when it is not able to discover — being concerned — others — the IP address of PT is required. The PPX transmits the IP address received from other PPX(s) to said PT.

[0032] 1. He must be registered into PPX3 in order for the location registration procedure PT 1 to telephone to other PTs1. Drawing 2 R> 2 explains a location registration procedure. A user (User) 1 switches on the power source of PT1a (S1). PT1a performs the notice of connection to BS2a (S2). PT1a performs the location registration demand to the PPP connection between PT1a and PPX3a (S4). At this time, PT1a is taken as an outside-of-the-circle display to User1 (S3). From the zone number in ID, PPX3a judges it as a self-zone terminal, and registers the terminal address into the location registration table for local station terminals (S5). A location registration response is returned to PT1a after registration termination (S6). PT1a which received this response is taken as a display within the circle to User1 (S7). [0033] 2. Drawing 3

explains the communication procedure in the communication procedure self-zone in a self-zone. User1 is off-hook in PT1a (Off Hook) — carrying out (S10) — PT1a passes the two sound which shows communication link **** (S11). User1 — ID (zone number + extension number) of PT1b of a communications partner — PT1a — dialing (S12) — the two sound of PT1a stops (S13). PT1a transmits the terminal address demand of PT1b to PPX3a after checking un-using [of BS2a] (S14) (S15). From the zone number in ID, PPX3a searches the location registration table for local station terminals (S16), and returns the terminal address to PT1a (S17). PT1a which received this is called to PT1b, and transmits a demand (S18). PT1b checks un-using [of BS2b] (S19), if unused, will be called to PT1a and will return response 1 (S20). Furthermore, it calls to User2 and a sound is transmitted (S22). Moreover, PT1a which received the call response 1 passes a call sound (S21). If User2 which has noticed the call sound carries out arrival-of-the-mail actuation (S23), PT1b will release voice pass and will go into a communication link condition while it calls and sends response 2 to PT1a (S24) (S25, S26).

[0034] 3. Drawing 4 explains a communication procedure with the terminal of a zone besides a communication procedure with the terminal of other zones. User1 is off-hook in PT1a (Off Hook) — carrying out (S30) — PT1a passes from an earphone the two sound which shows communication link **** (S31). If User1 dials ID of PT1c of a communications partner to PT1a (S32), a two sound will stop (S33). PT1a transmits the terminal address demand of PT1c to PPX3a (local station of PT1a) after checking un-using [of BS2a] (S34) (S35). From the zone number in ID, PPX3a judges that PT1c of a communications partner is the terminal of other zones, and searches the location registration table for external terminals (S36). When the terminal address is registered into the location registration table for external terminals, the terminal address of PT1c is returned as a reply signal to PT1a (S38). When not registered, the location registration table of PPX is searched using the zone number in a dial, it asks for the address of PPX3c, and the terminal address of PT1c is asked to PPX3c (S37). From the zone number within an inquiry signal, PPX3c searches the location registration table for local station terminals (S39), and returns the terminal address of PT1c to PPX3a (S40). PPX3a which received the terminal address of PPX3c to PT1c returns the terminal address of PT1c to PT1a (S41). PT1a which received the terminal address of PT1c is called to PT1c, and transmits a demand (42). PT1c checks un-using [of BS2c] (S43), if unused, will be called to PT1a and will return response 1 (S44). Furthermore, it calls to User 2 and a sound is passed (S45). If User2 which has noticed the call sound carries out arrival-of-the-mail actuation (S47), PT1c will release voice pass and will go into a communication link condition while it calls and sends response 2 to PT1a (S48) (S49, S50).

[0035] 4. A partner explains a communication procedure in case the terminal of the communication procedure self-zone at the time of the outside of the circle and power off is the outside of the circle or power off by drawing 5. User1 operates PT1a, and when a communication link demand is performed to PT1b of the self-zone used as the outside of the circle or power off (S51 thru/or S54, S55), PT1a transmits the terminal address demand of PT1b to PPX3a (S56). PPX3a searches the location registration table for local station terminals from the zone number within a demand signal (S57). However, when PT1b is already the outside of the circle or power off, the terminal address is deleted from the location registration table for local station terminals. Therefore, PPX3a cannot find the terminal address of PT1b. At this time, PPX3a returns the terminal field in a terminal address response as 0 to PT1a (S57, S58). PT1a which received this reply signal judges that a communication link is more nearly impossible than the value of the terminal field (S59), and shows a communication link impossible display to User1 (S60).

[0036] 5. Drawing 6 explains the location registration procedure at the time of zone migration besides the location registration procedure at the time of other zone migration. When User 1 holding PT1 moves out of a zone, PT1 detects the wireless line disconnection of a PPX3a zone (S61), and performs an outside-of-the-circle display to User 1 (S63). PPX3a will set PT1 terminal address of the location registration table for local station terminals to 0 after fixed time amount, if cutting of a wireless circuit with PT1 is notified from BS2 (S61) (S62). PT1 which moved to the zone of PPX3b makes PPP connection to PPX3b (S64), transmits ID of the newly

acquired terminal address and PT1 to PPX3b, and performs a location registration demand (S65). PPX3b registers positional information into the location registration table for external terminals from the zone number in ID transmitted from PT1 (S66). PPX3b is ID of PT1. With reference to the table for PPX, it asks for the address of PPX3a based on an inner zone number, and the location registration information on PT1 is transmitted to PPX3a (S67). PPX3a — the positional information of PT1 — the location registration table for local station terminals — registering (S68) — a location registration response is returned to PPX3b (S69). And PPX3b returns a location registration response to PT1 (S70). PT1 which received the location registration response from PPX3b shows a display within the circle to User 1 (S71).

[0037] 6. Location Registration Procedure at Time of Other Zone Migration (Multiplex Migration)
Drawing 7 explains the location registration procedure at the time of the multiplex migration which PT1 which moved to other zones moves to the zone of further others. In drawing 7, User1 shall move to a PPX3c zone (not shown in drawing 1) from a PPX3b zone. PT1 will perform an outside-of-the-circle display to User 1, if the wireless line disconnection of a PPX3b zone is detected (S72) (S73). if PPX3b is notified from BS for which cutting of a wireless circuit with PT1 was using PT1 (S74) — fixed time amount after — PT1 terminal address of the location registration table for external terminals — deleting (S75) — with reference to the table for PPX, a location registration deletion demand is transmitted to PPX3a (S76). In PPX3a, after setting the terminal address of PT1 of the location registration table for local station terminals to 0 (S77), a location registration deletion response is returned to PPX3b (S78). PT1 which moved to the zone of PPX3c makes PPP connection to PPX3c (S79), transmits ID of the newly acquired terminal address and PT1 to PPX3c, and performs a location registration demand (S81). PPX3c registers positional information into the location registration table for external terminals with the zone number in ID transmitted from PT1 (S82). PPX3c is ID of PT1. With reference to the table for PPX, it asks for the address of PPX1 based on an inner zone number, and the location registration information on PT1 is transmitted to PPX3a (S83). PPX3a registers the positional information of PT1 into the location registration table for local station terminals (S84), a location registration response is returned to PPX3c (S85), and PPX3c returns a location registration response to PT1 (S86). PT1 which received the location registration response from PPX3c shows a display within the circle to User 1 (S87).

[0038] 7. Communication Procedure after Other Zone Migration (Inside of Migration Place Zone)
Drawing 8 explains the communication procedure in the migration zone after other zone migration. If Off Hook [User1 / PT1a] (S90), PT1 will pass the two sound which shows communication link **** (S91). If User1 dials ID of PT1b of a communications partner to PT1a (S92), PT1a will stop a two sound (S93). PT1a transmits the terminal address demand of PT1b to PPX2b after checking un-using [of BS2-a] (S94) (S95). From the zone number in ID, PPX2b searches the location registration table for local station terminals (S96), and returns the terminal address to PT1a (S97). PT1a which received this is called to PT1b, and transmits a demand (S98). In PT1b, it checks un-using [of BS2-b] (S99), and if unused, it will call to PT1a and response 1 will be returned (S100). Furthermore, it calls to User 2 and a sound is transmitted (S102). Moreover, PT1a which received the call response 1 passes a call sound (S101). If arrival-of-the-mail actuation is carried out with a call sound (S103), User 2 will open voice pass wide and will go into a communication link condition (S104 thru/or S106).

[0039] 8. Drawing 9 explains the procedure in the case of communicating with the terminal of still more nearly another zone after zone migration besides a communication procedure with the other zone terminal at the time of other zone migration. If Off Hook [User1 / PT1a] (S110), the two sound which shows communication link **** will be passed (S111). If User1 dials ID of PT1c of a communications partner to PT1 (S111), a two sound will stop (S113). PT1a transmits the terminal address demand of PT1c to PPX3b after checking un-using [of BS2a] (S114) (S115). PT1c of a communications partner judges PPX3b to be the terminal of other zones from the zone number in ID, and the location registration table for external terminals is searched (S116). When the terminal address is registered into the location registration table for external terminals, the terminal address of PT1c is returned as a reply signal to PT1a (S117). When not registered, a PPX location registration table is searched using the zone number in a dial, it asks for the

address of PPX3c, and the terminal address of PT1c is asked to PPX3c (S118). From the zone number within an inquiry signal, PPX3c searches the location registration table for local station terminals (S119), and returns a response for the terminal address of PT1c to PPX3b (S120). PPX3b which received the terminal address of PPX3c to PT1c returns the terminal address of PT1c to PT1a (S121). PT1a which received the terminal address of PT1c is called to PT1c, and transmits a demand (S122). PT1c is PT1a, if it checks un-using [of BS3c] (S123) and is unused. It calls and response 1 is returned (S124). Furthermore, it calls to User 3 and a sound is transmitted (S126). Moreover, PT1a which received the call response 1 passes a call sound (S125). If arrival-of-the-mail actuation is carried out with a call sound (S127), User 3 will open voice pass wide and will go into a communication link condition (S128 thru/or S130).

[0040] 9. Positional Information Update Process at Time of PPX New Addition (when Using Connection Control Unit (henceforth Management Center) Defined Beforehand)

Drawing 10 explains the acquisition approach of a zone number when PPX is newly established by the addition of a new zone, and the approach of notifying the positional information of newly established PPX to other PPX(s). This drawing shows a procedure in case there is a management center. If new PPX acquires the IP address of a management center by the approach defined beforehand, a zone number will be required of a management center (S200). a management center — zone management information — referring to — an intact zone number — assigning (S201) — a zone number and a PPX address-mapping table are updated (S202), and a zone number is notified to Establishment PPX (S203). A management center notifies the positional information of Establishment PPX by the multicast or unicast communication link to established PPX, and updates PPX positional information (S204 thru/or S208).

[0041] 10. Positional Information Update Process at the Time of PPX New Addition (when Not Using Management Center)

Next, drawing 11 explains the procedure about the zone number acquisition approach of Establishment PPX when not using a management center, and the method of notifying other PPX (s) of the positional information of Establishment PPX. Establishment PPX collects the positional information of Existing PPX by multicast communication link (S300 thru/or S302). Based on the positional information (S303) (modification-PX positional information is returned to below for description of drawing) of established PPX, the positional information of self-PPX is created for an intact zone number as a zone number of self-PPX (S305). Establishment PPX notifies the created positional information by the multicast or unicast communication link to established PPX (S306, S307). Established PPX updates PPX positional information using this positional information (S308).

[0042] Various modification is possible for this invention within the limits of invention indicated by the claim, without being limited to the gestalt of the above operation, and it cannot be overemphasized that it is that by which they are also included within the limits of this invention.

[0043] Moreover, in this specification, a means does not necessarily mean a physical means, and the function of each means includes, also when software realizes. Furthermore, even if the function of one means is realized by two or more physical means, the function of two or more means may be realized by one physical means.

[Translation done.]

* NOTICES *

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1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.*** shows the word which can not be translated.

3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is a system configuration Fig. concerning the gestalt of operation of this invention.

[Drawing 2] It is the explanatory view of the location registration procedure in the gestalt of operation of this invention.

[Drawing 3] It is the explanatory view of the communication procedure in the self-zone in the gestalt of operation of this invention.

[Drawing 4] Also in the gestalt of operation of this invention, it is the explanatory view of a communication procedure with the terminal of a zone.

[Drawing 5] The partner in the gestalt of operation of this invention is the explanatory view of the communication procedure at the time of the outside of the circle and power off.

[Drawing 6] Also in the gestalt of operation of this invention, it is the explanatory view of the location registration procedure at the time of zone migration.

[Drawing 7] Also in the gestalt of operation of this invention, it is the explanatory view of the location registration procedure at the time of zone migration (at the time of multiplex migration).

[Drawing 8] Also in the gestalt of operation of this invention, it is the explanatory view of the communication procedure after zone migration (inside of a migration place zone).

[Drawing 9] Also in the gestalt of operation of this invention, it is the explanatory view of a communication procedure with the other zone terminal after zone migration.

[Drawing 10] It is the explanatory view of the positional information update process at the time of the PPX new addition in the gestalt of operation of this invention (when there is a management center).

[Drawing 11] It is the explanatory view of the positional information update process at the time of the PPX new addition in the gestalt of operation of this invention (when not using a management center).

[Description of Notations]

1 Cordless Handset (Terminal)

2 Main Phone (Base Station, BS)

3 Connection Control Unit (PPX)

4 Computer Network (LAN/WAN)

5 Area (Zone)

[Translation done.]

(51)Int.Cl. ⁷	識別記号	FI	テ-マ-ト*(参考)
H04Q 7/34		H04L 12/28	303 5K024
H04L 12/28	303	12/66	D 5K030
12/66		H04M 3/42	E 5K033
H04M 3/42		11/00	303 5K067
11/00	303	H04Q 7/04	C 5K101

審査請求 未請求 請求項の数12 OL (全 14 頁) 最終頁に続く

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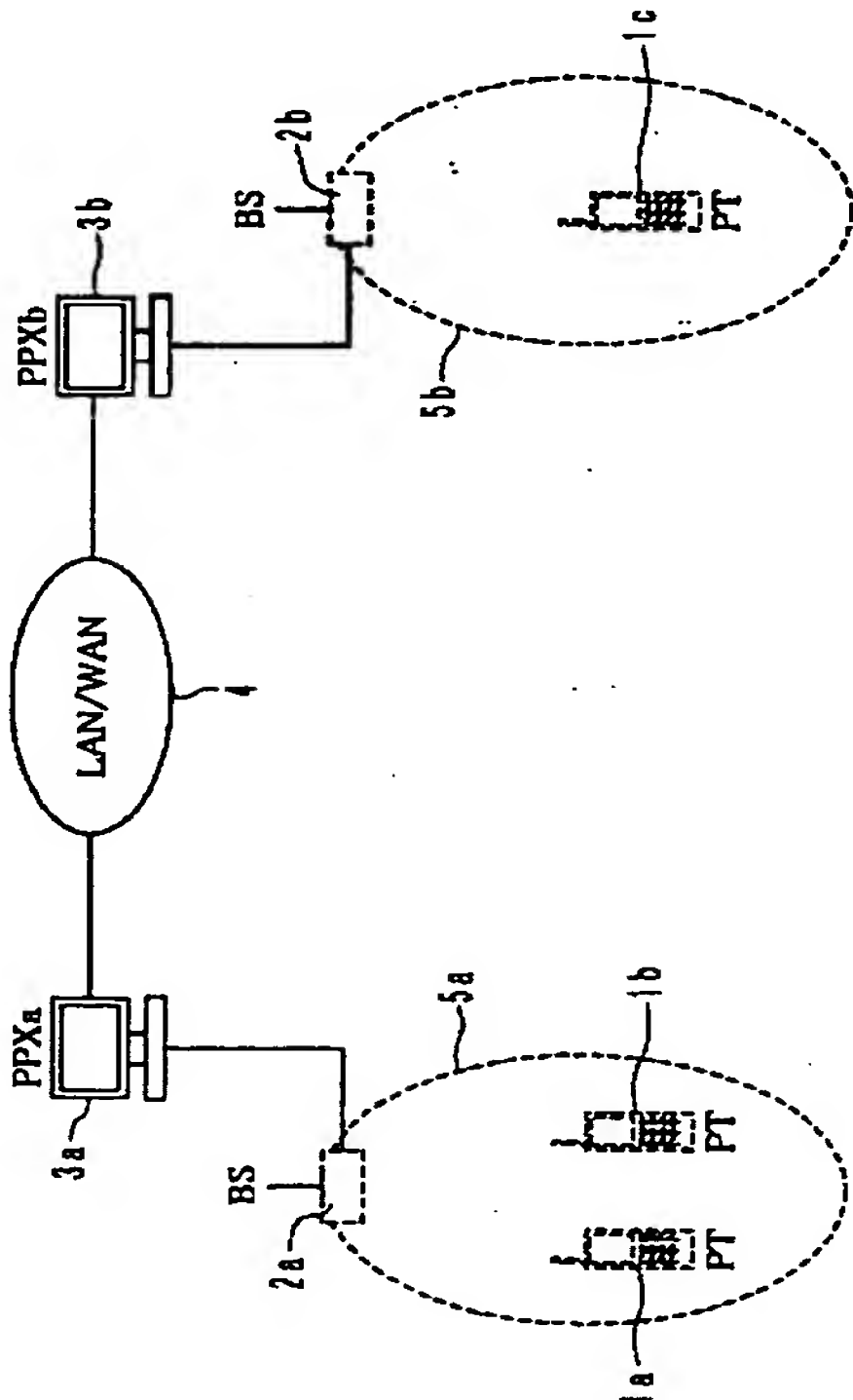
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(54)【発明の名称】 インターネット電話接続方法及びインターネット電話システム

(57)【要約】

【課題】 ロケーションを移動しても同じ電話番号を用いて通信が可能なインターネット電話接続方法において、ネットワーク制御装置（NSP）を不要として設備コストを低減する。

【解決手段】 ゾーン内の端末の位置情報を管理する接続制御装置とインターネット電話機から構成されるインターネット電話システムにおいて、相手端末のゾーン番号に基づき前記接続制御装置の位置登録テーブルを検索する第1ステップと、前記相手端末が自局内端末であると判定した場合、自局端末用位置登録テーブルより前記相手端末の端末アドレスを求める第2ステップと、前記相手端末が他局収容の端末であると判定した場合、外部端末用位置登録テーブルを検索する第3ステップと、前記外部端末用位置登録テーブルに前記相手端末の位置情報が登録されている場合、その位置情報から前記相手端末の端末アドレスを求める第4ステップとを備え、接続制御装置の位置登録テーブルを用いて相手端末番号をゾーン番号と端末アドレスに変換する。



【特許請求の範囲】

【請求項1】 ゾーン内の端末の位置情報を管理する接続制御装置とインターネット電話機から構成されるインターネット電話システムの接続方法において、相手端末のゾーン番号に基づき前記接続制御装置の位置登録テーブルを検索する第1ステップと、前記相手端末が自局内端末であると判定した場合、自局端末用位置登録テーブルより前記相手端末の端末アドレスを求める第2ステップと、前記相手端末が他局収容の端末であると判定した場合、外部端末用位置登録テーブルを検索する第3ステップと、前記外部端末用位置登録テーブルに前記相手端末の位置情報が登録されている場合、その位置情報から前記相手端末の端末アドレスを求める第4ステップとを備え、接続制御装置の位置登録テーブルを用いて相手端末番号を端末アドレスに変換することを特徴とするインターネット電話接続方法。

【請求項2】 前記第3ステップで前記外部端末用位置登録テーブルを検索した場合において、前記相手端末の位置情報がないとき、前記接続制御装置の接続制御装置登録テーブル及び前記相手端末のゾーン番号に基づき前記相手端末が収容されている前記接続制御装置の端末アドレスを求める第5ステップと、前記接続制御装置に対して前記相手端末の端末アドレスを問い合わせる第6ステップとを備えることを特徴とする請求項1記載のインターネット電話接続方法。

【請求項3】 端末が他ゾーンに移動したとき、前記自局端末用位置登録テーブルの当該端末アドレスを無効にするステップと、移動先の接続制御装置に位置登録要求を出して前記外部端末用位置登録テーブルに当該端末アドレスを登録するステップと、移動先の前記接続制御装置から前記端末の自局の前記接続制御装置へ位置情報を通知するステップとを備えることを特徴とする請求項1記載のインターネット電話接続方法。

【請求項4】 接続制御装置が新設されたとき、予め定められた接続制御装置から他の接続制御装置の位置情報を取得するステップと、予め定められた前記接続制御装置が新設された前記接続制御装置の位置情報を他の一部又は全部の接続制御装置に通知することを特徴とする請求項1記載のインターネット電話接続方法。

【請求項5】 接続制御装置が新設されたとき、ユニキャスト又はマルチキャストのいずれかにより近隣の接続制御装置を検索するステップと、近隣の前記接続制御装置から他の接続制御装置の位置情報を取得するステップと、マルチキャストにより新設された前記接続制御装置の位

置情報を他の一部又は全部の接続制御装置に通知することを特徴とする請求項1記載のインターネット電話接続方法。

【請求項6】 インターネットプロトコルにより通信を行う第1コードレス電話親機と、前記第1コードレス電話機親機及びコンピュータネットワークに接続され、前記第1コードレス電話機親機のゾーン内の子機の位置情報を管理する第1接続制御装置と、前記第1接続制御装置に対応付けられる第1子機と、インターネットプロトコルにより通信を行う第2コードレス電話親機と、

前記第2コードレス電話機親機及び前記コンピュータネットワークに接続され、前記第2コードレス電話機親機のゾーン内の子機の位置情報を管理する第2接続制御装置と、

前記第2接続制御装置に対応付けられる第2子機とを備え、

前記第1接続制御装置及び前記第2接続制御装置は、それぞれ、他の接続制御装置の位置情報を記憶する接続制御装置用テーブルと、自局に対応付けられた子機の位置情報を記憶する自局端末用位置登録テーブルと、自局に対応付けられていない子機の位置情報を記憶する他局端末用位置登録テーブルとを含み、

前記第1子機から前記第2子機へ呼が発生したときに、前記第1接続制御装置は、

前記第1子機からの要求に基づき前記自局端末用位置登録テーブル及び前記他局端末用位置登録テーブルを検索し、前記第2子機のアドレスを抽出してこれを前記第1コードレス電話機親機へ送信し、

前記第2子機のアドレスを発見できなかったときは、前記第2接続制御装置に前記第2子機のアドレスを要求し、

前記第2接続制御装置から前記第2子機のアドレスを受けたとき、これを前記第1コードレス電話機親機へ送信し、

前記第2接続制御装置は、

前記第1接続制御装置からの要求に基づき前記自局端末用位置登録テーブル及び前記他局端末用位置登録テーブルを検索し、前記第2子機のアドレスを抽出してこれを前記第1接続制御装置へ送信する、ことを特徴とするインターネット電話システム。

【請求項7】 前記第1接続制御装置は、前記第1子機から位置登録要求を受けたとき、その識別情報に基づき前記第1子機を自局端末と判定し、前記第1子機のアドレスを前記自局端末用位置登録テーブルに登録することを特徴とする請求項6記載のインターネット電話システム。

【請求項8】 前記第1接続制御装置は、前記第1子機に対して位置登録完了を通知することを特徴とする請求

項7記載のインターネット電話システム。

【請求項9】 前記第1接続制御装置は、前記第2子機から位置登録要求を受けたとき、その識別情報に基づき前記第1子機を他局端末と判定し、前記第2子機のアドレスを前記他局端末用位置登録テーブルに登録するとともに、前記第2接続制御装置に対して前記第1接続制御装置における前記第2子機のアドレスを通知し、前記第2接続制御装置は、前記第1接続制御装置からの通知を受けて、前記第1接続制御装置における前記第2子機のアドレスを前記自局端末用位置登録テーブルに再登録することを特徴とする請求項6記載のインターネット電話システム。

【請求項10】 さらに、前記第2接続制御装置は、前記第2子機のアドレスを再登録した旨の通知を前記第1接続制御装置に対して行い、前記第1接続制御装置は、前記第2接続制御装置からの再登録の通知を受けて、前記第2子機に対して位置登録完了を通知することを特徴とする請求項9記載のインターネット電話システム。

【請求項11】 前記第1接続制御装置は、前記第2子機が自局のゾーンを離れたときに、前記第2子機のアドレスを前記他局端末用位置登録テーブルから削除するとともに、前記第2接続制御装置に対して前記第2子機のアドレスを削除する要求を送信し、前記第2接続制御装置は、前記第2子機のアドレス削除要求を受けて、前記第2子機のアドレスを前記自局端末用位置登録テーブルから削除することを特徴とする請求項9記載のインターネット電話システム。

【請求項12】 前記第1接続制御装置は、前記第2接続制御装置から前記第2子機のアドレスを受けなかったとき、前記第1子機に対して通話不能を通知することを特徴とする請求項6記載のインターネット電話システム。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、インターネットプロトコルを用いて通信を行うためのインターネットコードレス電話システムの接続方法及びシステムに関する。

【0002】

【従来の技術】 この種の技術を開示するものとして、特開2000-308128号がある。従来から用いられているこの種のシステムには、VoIP技術が用いられる。インターネット網は、IPプロトコルを利用してデータを送受信するネットワーク世界であり、このIPネットワークを使って会話のやりとりをする技術をVoIP (Voice over IP) と呼ぶ。VoIPでは、音声を圧縮してパケットデータにし、送り手と行き先をIPアドレスと呼ばれる世界共通の住所で識別し、インターネット回線網を使って送受信する。

【0003】 従来のシステムの多くは、VoIP技術の標準

プロトコルであるH.323を用いており、H.323端末、ゲートキーパ、ゲートウェイ装置、多地点通信装置(MCU)から構成される。このうち、ゲートキーパは電話番号—IPアドレス変換に用いられる。

【0004】 このようなシステムによる基本的な接続手順においては、H.323端末は、まず、ゲートウェイ装置の番号を入力し、ゲートウェイ装置と接続する。ついで、相手先端末の電話番号を入力すると、ゲートキーパによる電話番号—IPアドレス変換が行われる。そして、該ゲートウェイ装置は、相手先端末のゲートウェイ装置を呼び出し、相手先端末のゲートウェイ装置は、相手先端末のゲートキーパへ接続申請をする。ここで、許可が出るとゲートウェイ装置は、端末間のコネクションを設定し、その後、端末間での呼び出しが行われコネクションが確立される。

【0005】 以上が、ファーストコネクトを前提とした標準プロトコルH.323による接続制御手順であり、電話番号を用いてインターネットを介した音声通信が可能となる。

【0006】

【発明が解決しようとする課題】 このようなシステムを実際に構成する場合、電話番号をIPアドレスに変換するゲートキーパ機能を有する装置NSP(網サービス制御装置)をネットワーク内に設置し、このNSPに対して、電話番号—IPアドレス変換と接続申請を行う方式が、大規模なネットワークの場合一般的である。

【0007】 しかし、このようなネットワーク構成を、事業所や地域の小規模なネットワークに適用する場合、NSPを設置する必要があるため、ネットワークの初期の設備費用が高くなるとともに、全ての通信がNSPを介して行われるため、NSPに処理が集中するとともにNSPの故障時に通信ができなくなるという問題がある。

【0008】 本発明が解決しようとする課題は、このようにNSP(網サービス制御局)をネットワークに設置し、電話番号—IPアドレス変換や接続申請処理を集中的に行う集中制御方式での問題点を解決することにある。

【0009】

【課題を解決するための手段】 この発明に係るインターネット電話接続方法は、ゾーン内の端末の位置情報を管理する接続制御装置とインターネット電話機から構成されるインターネット電話システムの接続方法において、相手端末のゾーン番号に基づき前記接続制御装置の位置登録テーブルを検索する第1ステップと、前記相手端末が自局内端末であると判定した場合、自局端末用位置登録テーブルより前記相手端末の端末アドレスを求める第2ステップと、前記相手端末が他局収容の端末であると判定した場合、外部端末用位置登録テーブルを検索する第3ステップと、前記外部端末用位置登録テーブルに前記相手端末の位置情報が登録されている場合、その位置情報から前記相手端末の端末アドレスを求める第4ステ

ップとを備え、接続制御装置の位置登録テーブルを用いて相手端末番号を端末アドレスに変換するものである。

【0010】好ましくは、前記第3ステップで前記外部端末用位置登録テーブルを検索した場合において、前記相手端末の位置情報がないとき、前記接続制御装置の接続制御装置登録テーブル及び前記相手端末のゾーン番号に基づき前記相手端末が収容されている前記接続制御装置の端末アドレスを求める第5ステップと、前記接続制御装置に対して前記相手端末の端末アドレスを問い合わせる第6ステップとを備える。

【0011】好ましくは、端末が他ゾーンに移動したとき、前記自局端末用位置登録テーブルの当該端末アドレスを無効にするステップと、移動先の接続制御装置に位置登録要求を出して前記外部端末用位置登録テーブルに当該端末アドレスを登録するステップと、移動先の前記接続制御装置から前記端末の自局の前記接続制御装置へ位置情報を通知するステップとを備える。

【0012】好ましくは、接続制御装置が新設されたとき、予め定められた接続制御装置から他の接続制御装置の位置情報を取得するステップと、予め定められた前記接続制御装置が新設された前記接続制御装置の位置情報を他の一部又は全部の接続制御装置に通知する。

【0013】好ましくは、接続制御装置が新設されたとき、ユニキャスト又はマルチキャストのいずれかにより近隣の接続制御装置を検索するステップと、近隣の前記接続制御装置から他の接続制御装置の位置情報を取得するステップと、マルチキャストにより新設された前記接続制御装置の位置情報を他の一部又は全部の接続制御装置に通知する。

【0014】本発明は、ネットワークに設けられる1台のNSPのかわりに、例えば、1つのフロアのあるいは複数のフロア単位（以下、この種の所定の領域を「ゾーン」と呼ぶ）に電話番号—IPアドレス変換や接続申請処理を行う接続制御装置を設置したものである。この種の接続制御装置が扱うゾーン数や端末数は比較的少なく、パソコン等への実装も可能であり、安価に実現可能である。

【0015】本方式の特徴は、ネットワーク管理として分散制御方式を用いている点にあり、電話番号—IPアドレス変換や接続申請処理を行う接続制御装置を、それぞれのゾーンに設置する。他ゾーンの端末との通信に必要な位置情報は接続制御装置間で通信し取得する。また、端末が他のゾーンへ移動した場合には、移動先のゾーンの接続制御装置に位置情報を登録するとともに、自ゾーンの接続制御装置にも位置情報を通知する。これにより、自ゾーンの接続制御装置および移動先の接続制御装置とも、移動した端末の位置情報を保持することができる。このため、移動した端末に対する通信において接続制御装置間の通信を省略でき、接続処理を簡単にすることができる。

【0016】新たなゾーンを新設する場合、接続制御装置を新設する必要があるが、この際、この接続制御装置は、例えば、マルチキャストにより隣接ゾーンの接続制御装置を発見し、発見した接続制御装置からネットワークに既に存在する接続制御装置の位置情報を取得するとともに、他の接続制御装置に自分の位置情報を通知する。これにより、新設ゾーンの端末が他ゾーンの端末と通信する場合、新設ゾーンの接続制御装置は、相手端末番号に含まれるゾーン番号と取得した接続制御装置位置情報から、他ゾーンの接続制御装置の位置情報を知ることができる。この接続制御装置から、相手端末の位置情報を知ることにより、新設ゾーンの端末は、他ゾーンの端末と通信することが可能となる。同様の方法により、既設ゾーンの端末は、該ゾーンの接続制御装置が新設ゾーンの接続制御装置から位置情報の通知を受けることにより、新設ゾーンの端末の位置情報を取得し、新設ゾーンの端末と通信することが可能となる。

【0017】上記の方式とは別に、新たなゾーンが新設された場合、新設の接続制御装置が予め定められた接続制御装置と通信を行い、既設ゾーンの全ての接続制御装置の位置情報を取得するとともに、予め定められた接続制御装置が、既設の接続制御装置に対して、新設の接続制御装置の位置情報を通知することにより、新設ゾーンの端末と既設ゾーンの端末の通信を可能にすることができる。

【0018】この発明に係るインターネット電話システムは、インターネットプロトコルにより通信を行う第1コードレス電話親機と、前記第1コードレス電話機親機及びコンピュータネットワークに接続され、前記第1コードレス電話機親機のゾーン内の子機の位置情報を管理する第1接続制御装置と、前記第1接続制御装置に対応付けられる第1子機と、インターネットプロトコルにより通信を行う第2コードレス電話親機と、前記第2コードレス電話機親機及び前記コンピュータネットワークに接続され、前記第2コードレス電話機親機のゾーン内の子機の位置情報を管理する第2接続制御装置と、前記第2接続制御装置に対応付けられる第2子機とを備え、前記第1接続制御装置及び前記第2接続制御装置は、それぞれ、他の接続制御装置の位置情報を記憶する接続制御装置用テーブルと、自局に対応付けられた子機の位置情報を記憶する自局端末用位置登録テーブルと、自局に対応付けられていない子機の位置情報を記憶する他局端末用位置登録テーブルとを含み、前記第1子機から前記第2子機へ呼が発生したときに、前記第1接続制御装置は、前記第1子機からの要求に基づき前記自局端末用位置登録テーブル及び前記他局端末用位置登録テーブルを検索し、前記第2子機のアドレスを抽出してこれを前記第1コードレス電話機親機へ送信し、前記第2子機のアドレスを発見できなかったときは、前記第2接続制御装置に前記第2子機のアドレスを要求し、前記第2接続制

御装置から前記第2子機のアドレスを受けたとき、これを前記第1コードレス電話機親機へ送信し、前記第2接続制御装置は、前記第1接続制御装置からの要求に基づき前記自局端末用位置登録テーブル及び前記他局端末用位置登録テーブルを検索し、前記第2子機のアドレスを抽出してこれを前記第1接続制御装置へ送信する、ものである。

【0019】好ましくは、前記第1接続制御装置は、前記第1子機から位置登録要求を受けたとき、その識別情報に基づき前記第1子機を自局端末と判定し、前記第1子機のアドレスを前記自局端末用位置登録テーブルに登録する。

【0020】好ましくは、前記第1接続制御装置は、前記第1子機に対して位置登録完了を通知する。

【0021】好ましくは、前記第1接続制御装置は、前記第2子機から位置登録要求を受けたとき、その識別情報に基づき前記第1子機を他局端末と判定し、前記第2子機のアドレスを前記他局端末用位置登録テーブルに登録するとともに、前記第2接続制御装置に対して前記第1接続制御装置における前記第2子機のアドレスを通知し、前記第2接続制御装置は、前記第1接続制御装置からの通知を受けて、前記第1接続制御装置における前記第2子機のアドレスを前記自局端末用位置登録テーブルに再登録する。

【0022】好ましくは、さらに、前記第2接続制御装置は、前記第2子機のアドレスを再登録した旨の通知を前記第1接続制御装置に対して行い、前記第1接続制御装置は、前記第2接続制御装置からの再登録の通知を受けて、前記第2子機に対して位置登録完了を通知する。

【0023】好ましくは、前記第1接続制御装置は、前記第2子機が自局のゾーンを離れたときに、前記第2子機のアドレスを前記他局端末用位置登録テーブルから削除するとともに、前記第2接続制御装置に対して前記第2子機のアドレスを削除する要求を送信し、前記第2接続制御装置は、前記第2子機のアドレス削除要求を受けて、前記第2子機のアドレスを前記自局端末用位置登録テーブルから削除する。

【0024】好ましくは、前記第1接続制御装置は、前記第2接続制御装置から前記第2子機のアドレスを受けなかったとき、前記第1子機に対して通話不能を通知する。

【0025】

【発明の実施の形態】以下、この発明の実施の形態について、図を用いて具体的に説明する。基本的なシステム構成を図1を用いて説明する。本システムは、複数のインターネット電話機1（以下PTと略記）と接続制御装置3（以下PPXと略記することがある）により1つのゾーン5を構成する。インターネット電話機は、子機1と親機2（BS）から構成され、子機1と親機2は無線インターフェースで接続され、親機2はLAN/WAN4と接続され

る。親機2は図示しないハブあるいはルータを介して接続制御装置3と接続される。この場合に用いられる通信プロトコルは、TCP/IPのインターネットプロトコルである。ゾーン5間はインターネットあるいは通常の無線インターフェースを用いて接続される。

【0026】図1の例では、子機1a、1bが親機2aのエリア内に位置し、子機1cが親機2bのエリア内に位置する。親機2aがPPX3aに接続され、親機2bがPPX3bに接続されている。子機1a、1bは、それぞれ、親機2a、PPX3a、LAN/WAN4、PPX3b、親機2bを通じて、子機1cと通話することができる。本システムのように子機1と親機2が無線で接続されている場合、子機1はいずれかのエリア5内にあれば、その親機2を通じて他の子機1と通話することができる。例えば、図1で子機1bがエリア5bに移動したとき、そこで子機1bは他の子機1aと通話することができる。そのためには、子機1がエリアを移動して他のエリアに入ったことをPPX3が検出するとともに、そのことを他のPPX3に通知しなければならない。そのためのプロトコルについては後述する。

【0027】次に、通信手順の詳細な手順を、図1の基本的なシステムを前提に述べる。まず、前提として子機（PT）1の設定が行われていなければならない。PT1の初期設定項目としてIDが設定される。このIDはPPX3がPT1を認証する場合に用いる。認証手順については、パスワードを用いる既存の手順を想定するがここではその詳細を省略する。PT1の親機2（以下BSと略記ことがある）は、他に親機2の接続するLAN4の端末アドレス、サブネットマスク、ブロードキャストアドレスをDHCP等のプロトコルによりルータより取得する。

【0028】PPX3の初期設定項目としてはID、PPX3の端末アドレス、サブネットマスク、ブロードキャストアドレスが設定される。その目的や取得方法はPT1と同様である。但し、PPX3のIDはPPX3間の認証に用いられる。PPX3には、更に、PPXの位置情報を管理するPPX用テーブル、端末の位置情報を管理する自局端末用位置登録テーブル、外部端末用位置登録テーブルが設けられる。なお、BS2が複数の端末アドレスを持つ場合には、PPX3にBS-端末アドレス管理テーブルが設定される。

【0029】このように、PPXに、PPX用テーブル、自局端末用位置登録テーブル及び外部端末用位置登録テーブルを設けることにより、NSPを設ける必要がなくなる。

【0030】位置登録要求により、PTが現在存在するゾーンを管理するPPXに対して、PTがそのゾーンに存在することを知らせるとともに、そのPTのIPアドレスを端末用位置登録テーブルに登録させる。前記PPXにとってそのPTが自局ゾーンの端末であるとき、そのPTのIPアドレスは自局端末用位置登録テーブルに登録され、そのPTが他局ゾーンの端末であるとき、そのPTのIPアドレスは他局端末用位置登録テーブルに登録される。PTが自局ゾー

ンの端末であるか、それとも他局ゾーンの端末であるかどうかは、PTのIDで判定される。PTが他局ゾーンに移動して他局のPPXの他局端末用位置登録テーブルに登録されるとき、前記他局のPPXでのPTのIPアドレスは自局のPPXに通知され、そのPPXの自局端末用位置登録テーブルに登録される。この手順については後に詳述する。

【0031】PTが他のPTと通信するとき、まずPTは現在自分が位置するゾーンを管理するPPXに対して当該他のPTのIPアドレスを要求する。そのPPXは自分の自局端末用位置登録テーブル及び外部端末用位置登録テーブルを検索し、当該他のPTのIPアドレスを発見したときはそのIPアドレスを前記PTへ送信する。発見できなかったときは、そのPPXは他のPPXに当該他のPTのIPアドレスを要求する。そのPPXは他のPPXから受けたIPアドレスを前記PTへ送信する。

【0032】1. 位置登録手順

PT1が他のPT1と通話するためには、自分自身をPPX3に登録しなければならない。位置登録手順を、図2により説明する。利用者(User)1がPT1aの電源を投入する(S1)。PT1aはBS2aに対する接続通知を行う(S2)。PT1aはPT1aとPPX3aの間のPP接続に対する位置登録要求を行う(S4)。このとき、PT1aはUser1に対しては圏外表示とする(S3)。PPX3aはID内のゾーン番号より自ゾーン端末と判断し、自局端末用位置登録テーブルに端末アドレスを登録する(S5)。登録終了後、PT1aへ位置登録応答を返す(S6)。この応答を受信したPT1aはUser1に対して圏内表示とする(S7)。

【0033】2. 自ゾーン内の通信手順

自ゾーン内での通信手順を、図3により説明する。User1がPT1aをオフフック(Off Hook)する(S10)と、PT1aは通信可能を示すツープ音を流す(S11)。User1が通信相手のPT1bのID(ゾーン番号+内線番号)をPT1aへダイヤルする(S12)と、PT1aのツープ音は停止する(S13)。PT1aは、BS2aの未利用を確認後(S14)、PPX3aへPT1bの端末アドレス要求を送信する(S15)。PPX3aは、ID内のゾーン番号より自局端末用位置登録テーブルを検索し(S16)、端末アドレスをPT1aに返す(S17)。これを受けたPT1aはPT1bへ呼び出し要求を送信する(S18)。PT1bはBS2bの未利用を確認し(S19)、未利用ならばPT1aへ呼び出し応答1を返す(S20)。さらに、User2に呼び出し音を送信する(S22)。また、呼び出し応答1を受信したPT1aは、呼び出し音を流す(S21)。呼び出し音に気づいたUser2が着信操作をすると(S23)、PT1bは呼び出し応答2をPT1aに送るとともに(S24)、音声パスを解放し通信状態に入る(S25、S26)。

【0034】3. 他ゾーンの端末との通信手順

他ゾーンの端末との通信手順を、図4により説明する。

User1がPT1aをオフフック(Off Hook)する(S30)と、PT1aは通信可能を示すツープ音を受話器から流す(S31)。User1が通信相手のPT1cのIDをPT1aへダイヤルすると(S32)、ツープ音は停止する(S33)。PT1aはBS2aの未利用を確認後(S34)、PPX3a(PT1aの自局)へPT1cの端末アドレス要求を送信する(S35)。PPX3aはID内のゾーン番号より、通信相手のPT1cが他ゾーンの端末であると判断し、外部端末用位置登録テーブルを検索する(S36)。もし端末アドレスが外部端末用位置登録テーブルに登録されていた場合は、PT1aへPT1cの端末アドレスを応答信号として返す(S38)。登録されていない場合、PPXの位置登録テーブルをダイヤル内のゾーン番号を用いて検索し、PPX3cのアドレスを求め、PPX3cへPT1cの端末アドレスを問い合わせる(S37)。PPX3cは、問い合わせ信号内のゾーン番号より自局端末用位置登録テーブルを検索し(S39)、PT1cの端末アドレスをPPX3aへ返す(S40)。PPX3cからPT1cの端末アドレスを受信したPPX3aはPT1aへPT1cの端末アドレスを返す(S41)。PT1cの端末アドレスを受信したPT1aはPT1cへ呼び出し要求を送信する(S42)。PT1cはBS2cの未利用を確認し(S43)、未利用ならばPT1aへ呼び出し応答1を返す(S44)。さらに、User2に呼び出し音を流す(S45)。呼び出し音に気づいたUser2が着信操作をすると(S47)、PT1cは呼び出し応答2をPT1aに送るとともに(S48)、音声パスを解放し通信状態に入る(S49、S50)。

【0035】4. 相手が圏外・電源断時の通信手順

自ゾーンの端末が圏外または電源断の場合の通信手順を図5により説明する。User1がPT1aを操作して、圏外または電源断となった自ゾーンのPT1bへ通信要求を行った場合(S51乃至S54、S55)、PT1aはPPX3aに対してPT1bの端末アドレス要求を送信する(S56)。PPX3aは、要求信号内のゾーン番号より自局端末用位置登録テーブルを検索する(S57)。しかし、PT1bは既に圏外または電源断であるとき自局端末用位置登録テーブルから端末アドレスが削除されている。そのため、PPX3aはPT1bの端末アドレスを見つけない。このとき、PPX3aは、PT1aに対して端末アドレス応答内の端末フィールドを0として返す(S57、S58)。この応答信号を受信したPT1aは端末フィールドの値より通信不可能と判断し(S59)、通信不可能表示をUser1に示す(S60)。

【0036】5. 他ゾーン移動時の位置登録手順

他ゾーン移動時の位置登録手順を図6により説明する。PT1を保持するUser1がゾーン外に移動した場合、PT1はPPX3aゾーンの無線回線切断を検出し(S61)、User1に対して圏外表示を行う(S63)。PPX3aは、PT1との無線回線の切断がBS2から通知されると(S61)、一定時間後に、自局端末用位置登録テーブルのPT

1端末アドレスを0とする(S62)。PPX3bのゾーンに移動したPT1は、PPP接続をPPX3bに対して行い(S64)、新たに取得した端末アドレスとPT1のIDを、PPX3bへ送信し位置登録要求を行う(S65)。PPX3bはPT1から送信されたID内のゾーン番号より外部端末用位置登録テーブルに位置情報を登録する(S66)。PPX3bは、PT1のID内のゾーン番号を基にPPX用テーブルを参照し、PPX3aのアドレスを求め、PPX3aへPT1の位置登録情報を送信する(S67)。PPX3aはPT1の位置情報を自局端末用位置登録テーブルに登録する(S68)とともに、PPX3bへ位置登録応答を返す(S69)。そして、PPX3bはPT1へ位置登録応答を返す(S70)。PPX3bからの位置登録応答を受信したPT1は、圏内表示をUser1に示す(S71)。

【0037】6. 他ゾーン移動時の位置登録手順(多重移動)

他ゾーンに移動したPT1が更に他のゾーンに移動する多重移動時の位置登録手順を図7により説明する。図7では、User1はPPX3bゾーンからPPX3cゾーン(図1には示さず)に移動するものとする。PT1はPPX3bゾーンの無線回線切断を検出すると(S72)、User1に圏外表示を行う(S73)。PPX3bは、PT1との無線回線の切断がPT1の使用していたBSから通知されると(S74)、一定時間後に、外部端末用位置登録テーブルのPT1端末アドレスを削除する(S75)とともに、PPX用テーブルを参照し、PPX3aへ位置登録削除要求を送信する(S76)。PPX3aでは自局端末用位置登録テーブルのPT1の端末アドレスを0にした後(S77)、PPX3bへ位置登録削除応答を返す(S78)。PPX3cのゾーンに移動したPT1は、PPP接続をPPX3cに対して行い(S79)、新たに取得した端末アドレスとPT1のIDをPPX3cへ送信し、位置登録要求を行う(S81)。PPX3cはPT1から送信されたID内のゾーン番号により外部端末用位置登録テーブルに位置情報を登録する(S82)。PPX3cは、PT1のID内のゾーン番号を基にPPX用テーブルを参照し、PPX1のアドレスを求め、PPX3aへPT1の位置登録情報を送信する(S83)。PPX3aはPT1の位置情報を自局端末用位置登録テーブルに登録し(S84)、PPX3cへ位置登録応答を返し(S85)、PPX3cはPT1へ位置登録応答を返す(S86)。PPX3cからの位置登録応答を受信したPT1は、圏内表示をUser1に示す(S87)。

【0038】7. 他ゾーン移動後の通信手順(移動先ゾーン内)

他ゾーン移動後の移動ゾーン内での通信手順を図8により説明する。User1がPT1aをOff Hookすると(S90)、PT1は通信可能を示すツープ音を流す(S91)。User1が通信相手のPT1bのIDをPT1aへダイヤルすると(S92)、PT1aはツープ音は停止する(S93)。PT1aは、BS2-aの未利用を確認後(S94)、PPX2bへPT

1bの端末アドレス要求を送信する(S95)。PPX2bは、ID内のゾーン番号より自局端末用位置登録テーブルを検索し(S96)、端末アドレスをPT1aに返す(S97)。これを受けたPT1aはPT1bへ呼び出し要求を送信する(S98)。PT1bではBS2-bの未利用を確認し(S99)、未利用ならばPT1aへ呼び出し応答1を返す(S100)。さらに、User2に呼び出し音を送信する(S102)。また、呼び出し応答1を受信したPT1aは、呼び出し音を流す(S101)。User2は呼び出し音により着信操作をすると(S103)、音声パスを開放し通信状態に入る(S104乃至S106)。

【0039】8. 他ゾーン移動時の他ゾーン端末との通信手順

他ゾーン移動後にさらに別のゾーンの端末と通信する場合の手順を図9により説明する。User1がPT1aをOff Hookすると(S110)、通信可能を示すツープ音を流す(S111)。User1が通信相手のPT1cのIDをPT1aへダイヤルすると(S111)、ツープ音は停止する(S113)。PT1aはBS2aの未利用を確認後(S114)、PPX3bへPT1cの端末アドレス要求を送信する(S115)。PPX3bはID内のゾーン番号より通信相手のPT1cが他ゾーンの端末と判断し、外部端末用位置登録テーブルを検索する(S116)。もし端末アドレスが外部端末用位置登録テーブルに登録されていた場合は、PT1aへPT1cの端末アドレスを応答信号として返す(S117)。登録されていない場合、PPX位置登録テーブルをダイヤル内のゾーン番号を用いて検索し、PPX3cのアドレスを求め、PPX3cへPT1cの端末アドレスを問い合わせる(S118)。PPX3cは、問い合わせ信号内のゾーン番号より自局端末用位置登録テーブルを検索し(S119)、PT1cの端末アドレスをPPX3bへ応答を返す(S120)。PPX3cからPT1cの端末アドレスを受信したPPX3bは、PT1aへPT1cの端末アドレスを返す(S121)。PT1cの端末アドレスを受信したPT1aはPT1cへ呼び出し要求を送信する(S122)。PT1cはBS3cの未利用を確認し(S123)、未利用ならばPT1aへ呼び出し応答1を返す(S124)。さらに、User3に呼び出し音を送信する(S126)。また、呼び出し応答1を受信したPT1aは、呼び出し音を流す(S125)。User3は呼び出し音により着信操作をすると(S127)、音声パスを開放し通信状態に入る(S128乃至S130)。

【0040】9. PPX新規追加時の位置情報更新処理(予め定められた接続制御装置(以下管理センタという)を用いる場合)

新たなゾーンの追加によりPPXが新設された場合のゾーン番号の取得方法と、新たに新設されたPPXの位置情報を他PPXへ通知する方法について図10により説明する。同図は管理センタがある場合の手順を示す。新設のPPX

は、予め定められた方法で管理センタのIPアドレスを取得すると、ゾーン番号を管理センタに要求する（S200）。管理センタはゾーン管理情報を参照し、未使用のゾーン番号を割り振る（S201）とともに、ゾーン番号とPPXアドレス対応表を更新し（S202）、新設PPXにゾーン番号を通知する（S203）。管理センタは、新設PPXの位置情報を既設のPPXに対して、マルチキャストあるいはユニキャスト通信により通知し、PPX位置情報の更新を行う（S204乃至S208）。

【0041】10. PPX新規追加時の位置情報更新処理（管理センタを用いない場合）

次に管理センタを用いない場合の、新設PPXのゾーン番号取得方法と、新設PPXの位置情報の他PPXへの通知法について、その手順を図11により説明する。新設PPXはマルチキャスト通信により既存PPXの位置情報を収集する（S300乃至S302）。既設PPXの位置情報（S303）（図の記述を以下に変更：PPX位置情報を返送）に基づき未使用のゾーン番号を自PPXのゾーン番号として自PPXの位置情報を作成する（S305）。新設PPXは作成した位置情報を既設のPPXに対して、マルチキャストあるいはユニキャスト通信により通知する（S306、S307）。既設PPXは、該位置情報を用いてPPX位置情報の更新を行う（S308）。

【0042】本発明は、以上の実施の形態に限定されることなく、特許請求の範囲に記載された発明の範囲内で、種々の変更が可能であり、それらも本発明の範囲内に包含されるものであることは言うまでもない。

【0043】また、本明細書において、手段とは必ずしも物理的手段を意味するものではなく、各手段の機能が、ソフトウェアによって実現される場合も包含する。さらに、一つの手段の機能が、二つ以上の物理的手段により実現されても、若しくは、二つ以上の手段の機能が、一つの物理的手段により実現されてもよい。

【0044】

【発明の効果】以上、詳細に説明したように、本発明では、端末の位置情報をゾーン毎に設置された接続制御装置が相互に端末の位置情報を交換することにより取得し、端末番号と端末アドレスの変換を行うことにより、端末が他のゾーンに移動したときでも同じ端末番号を用いて発着信が可能となる。また、NSP（網サービス制御装置）を設置する必要がなく、ゾーン毎に接続制御装置を

設置するだけでゾーン内およびゾーン間の通信が可能となる。従って、本発明を用いれば、事業所や地域等の比較的規模の小さいネットワークを構築する上で、設備コストを抑えることができる。また、NSPの故障によりネットワークの通信が不通になるといった問題を回避することができる。

【0045】また、本発明では、ゾーンが新設されネットワーク規模が拡大した場合でも、接続装置間の位置情報の更新が可能になり、ネットワークのスケラビリティを保証することが可能となる。

【図面の簡単な説明】

【図1】 本発明の実施の形態に係るシステム構成図である。

【図2】 本発明の実施の形態における位置登録手順の説明図である。

【図3】 本発明の実施の形態における自ゾーン内の通信手順の説明図である。

【図4】 本発明の実施の形態における他ゾーンの端末との通信手順の説明図である。

【図5】 本発明の実施の形態における相手が圏外・電源断時の通信手順の説明図である。

【図6】 本発明の実施の形態における他ゾーン移動時の位置登録手順の説明図である。

【図7】 本発明の実施の形態における他ゾーン移動時の位置登録手順（多重移動時）の説明図である。

【図8】 本発明の実施の形態における他ゾーン移動後の通信手順（移動先ゾーン内）の説明図である。

【図9】 本発明の実施の形態における他ゾーン移動後の他ゾーン端末との通信手順の説明図である。

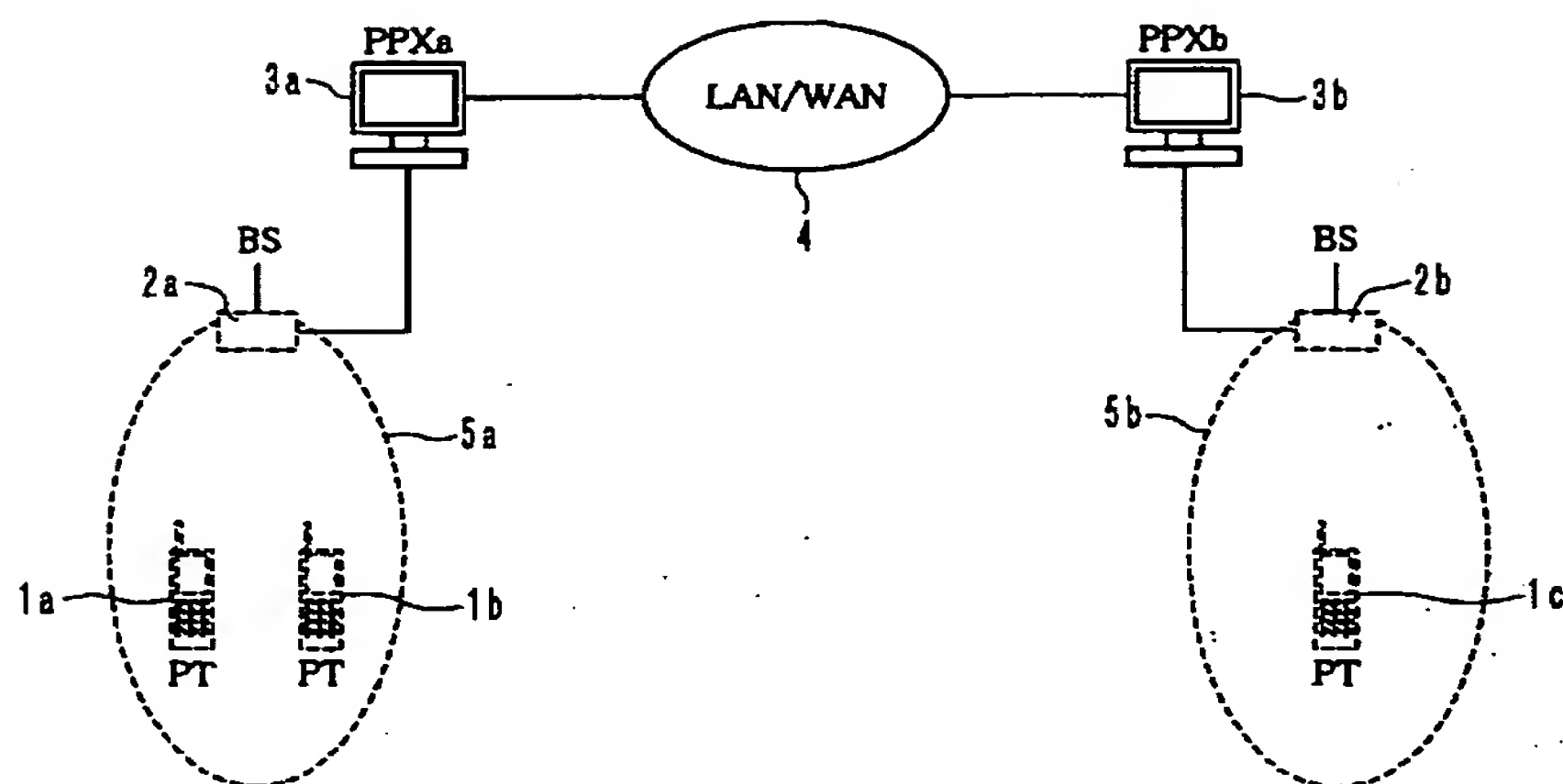
【図10】 本発明の実施の形態におけるPPX新規追加時の位置情報更新処理（管理センタがある場合）の説明図である。

【図11】 本発明の実施の形態におけるPPX新規追加時の位置情報更新処理（管理センタを用いない場合）の説明図である。

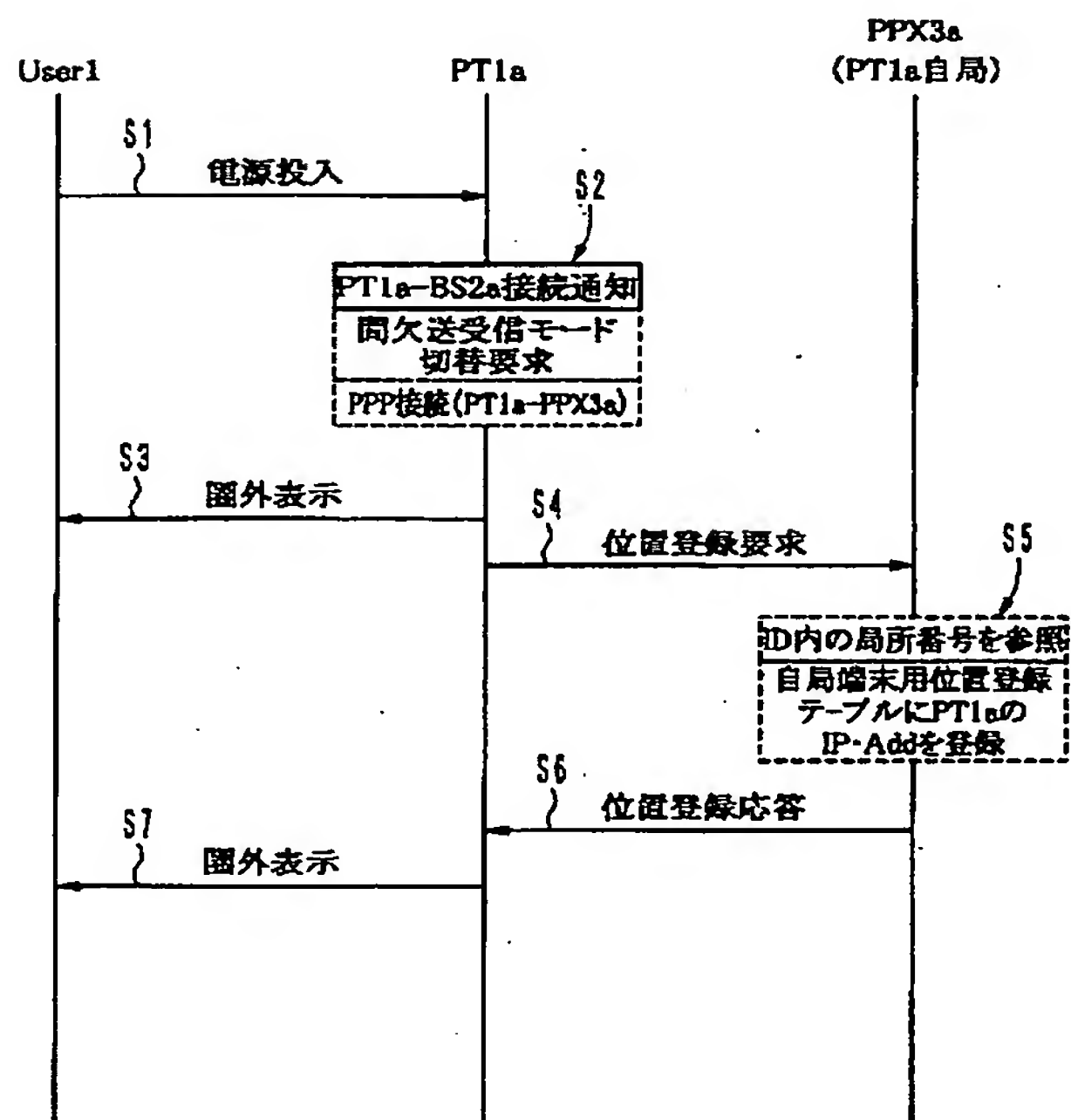
【符号の説明】

- 1 子機（端末）
- 2 親機（基地局、BS）
- 3 接続制御装置（PPX）
- 4 コンピュータネットワーク（LAN/WAN）
- 5 エリア（ゾーン）

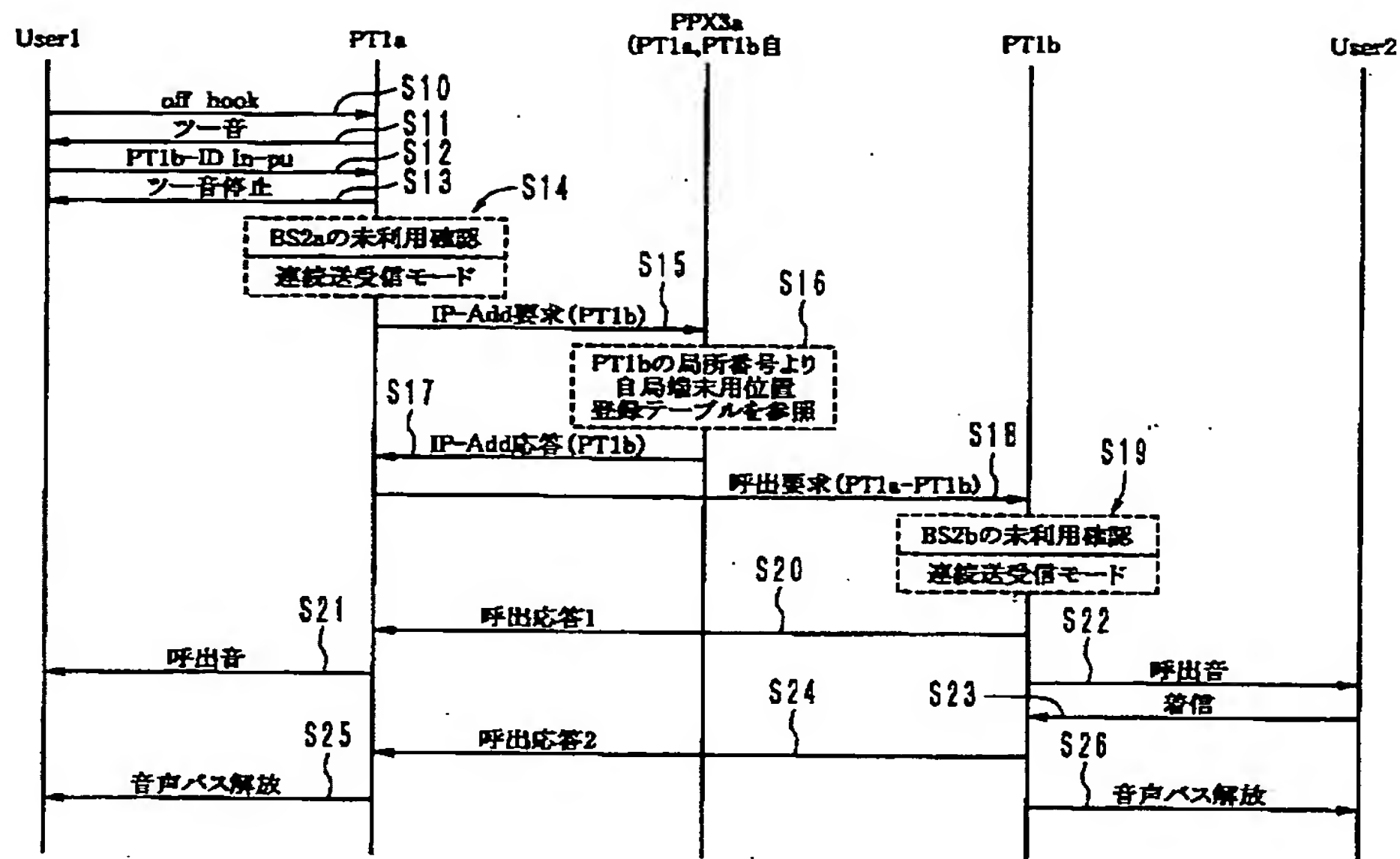
【図1】



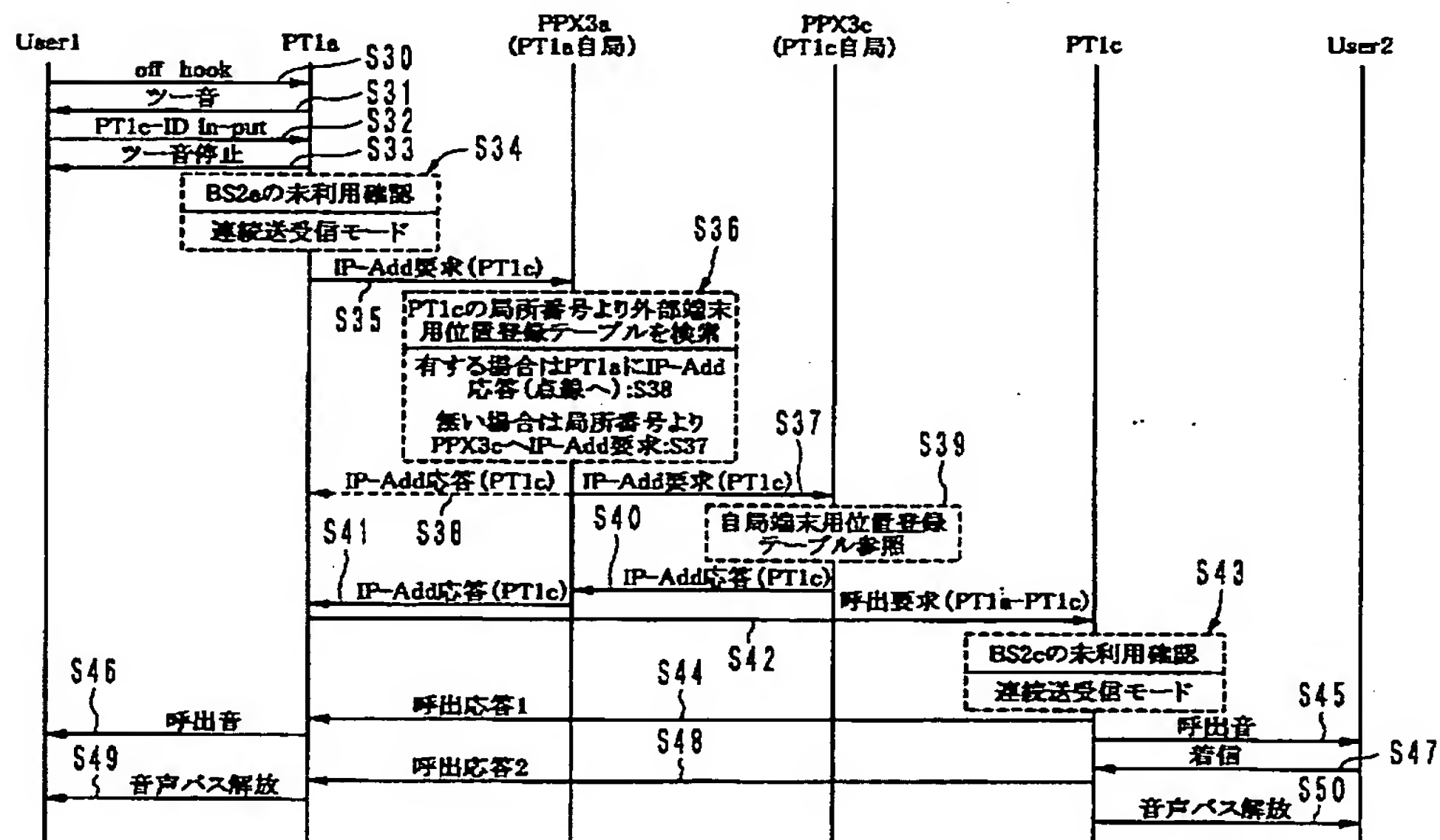
【図2】



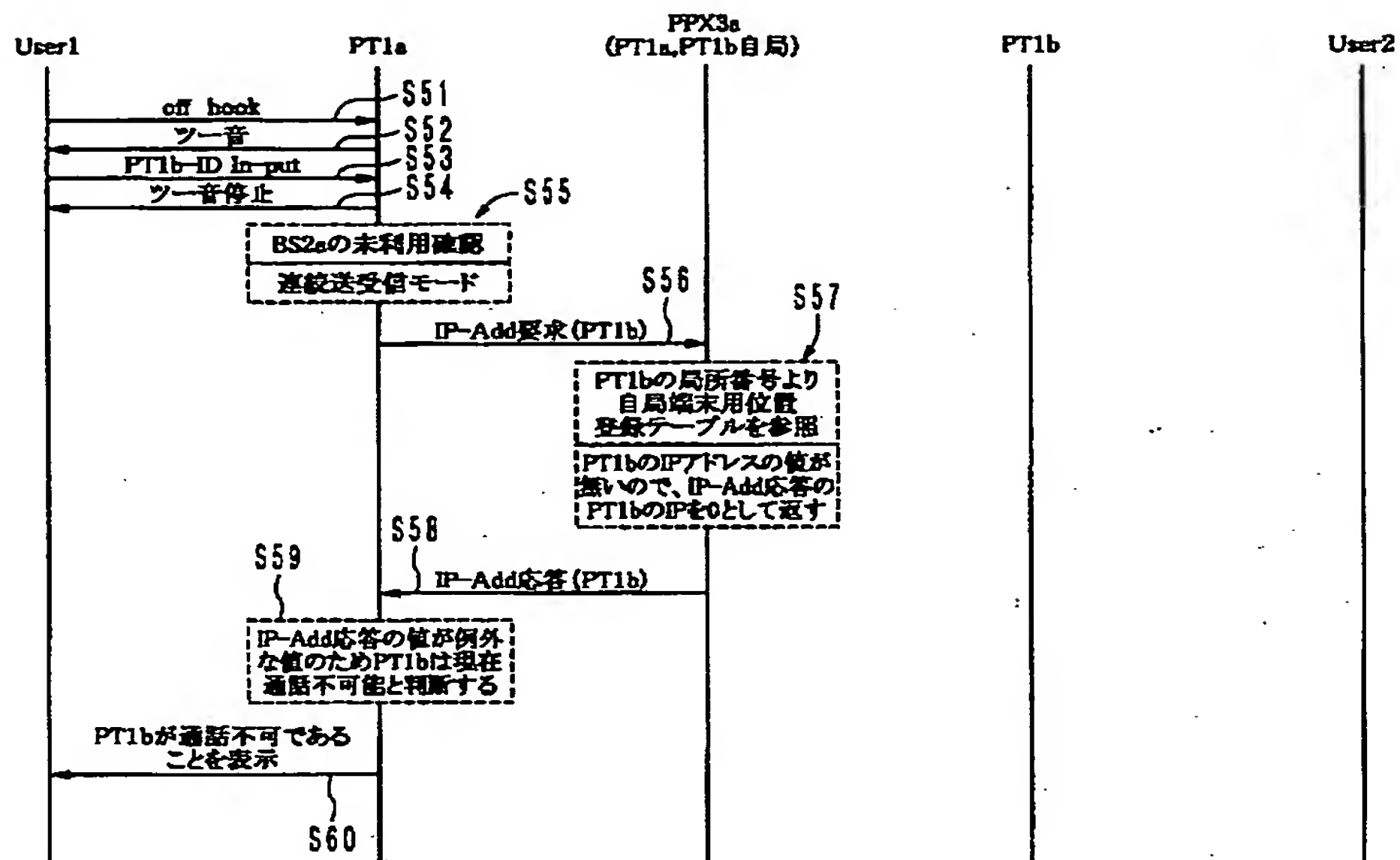
【図3】



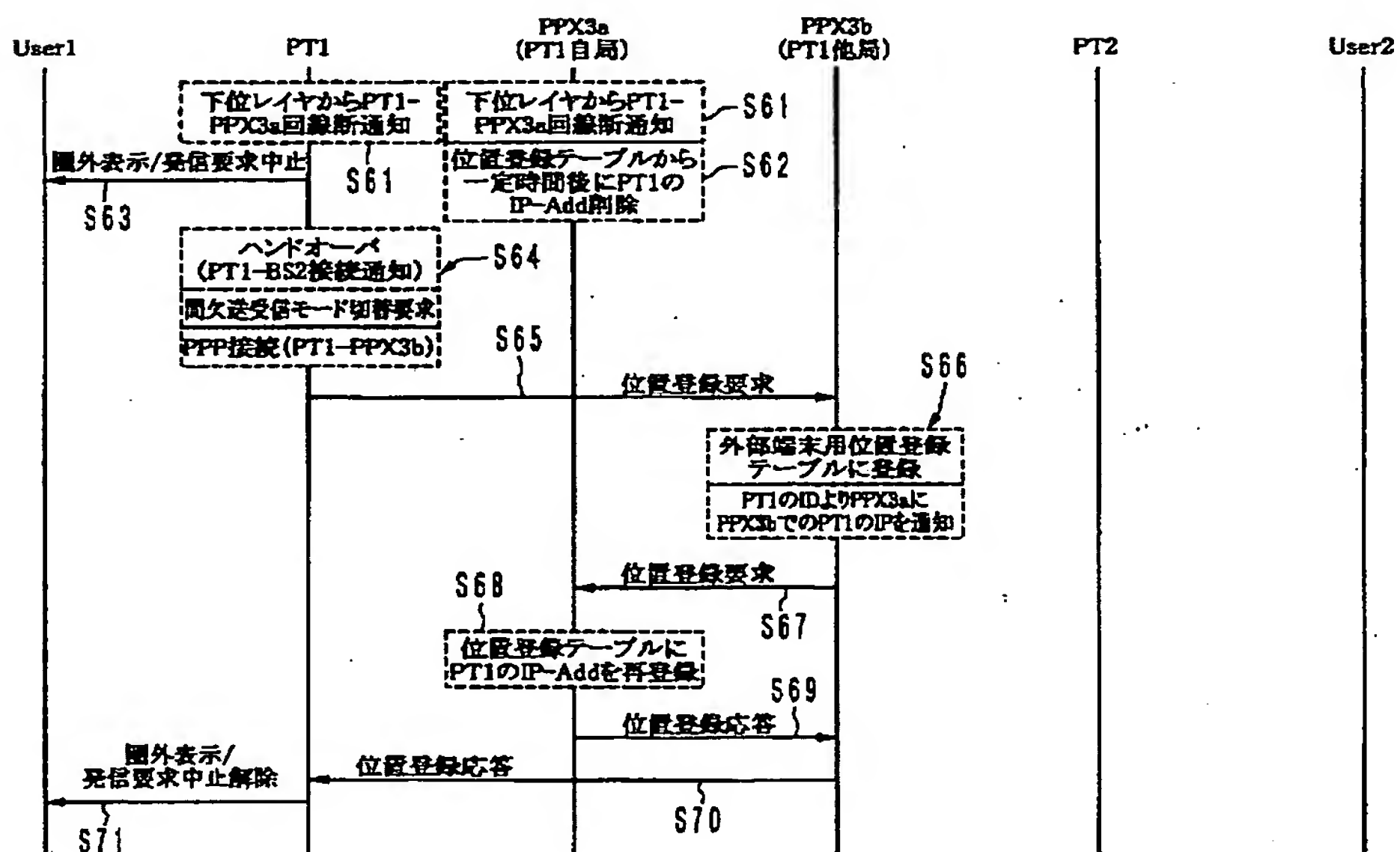
【図4】



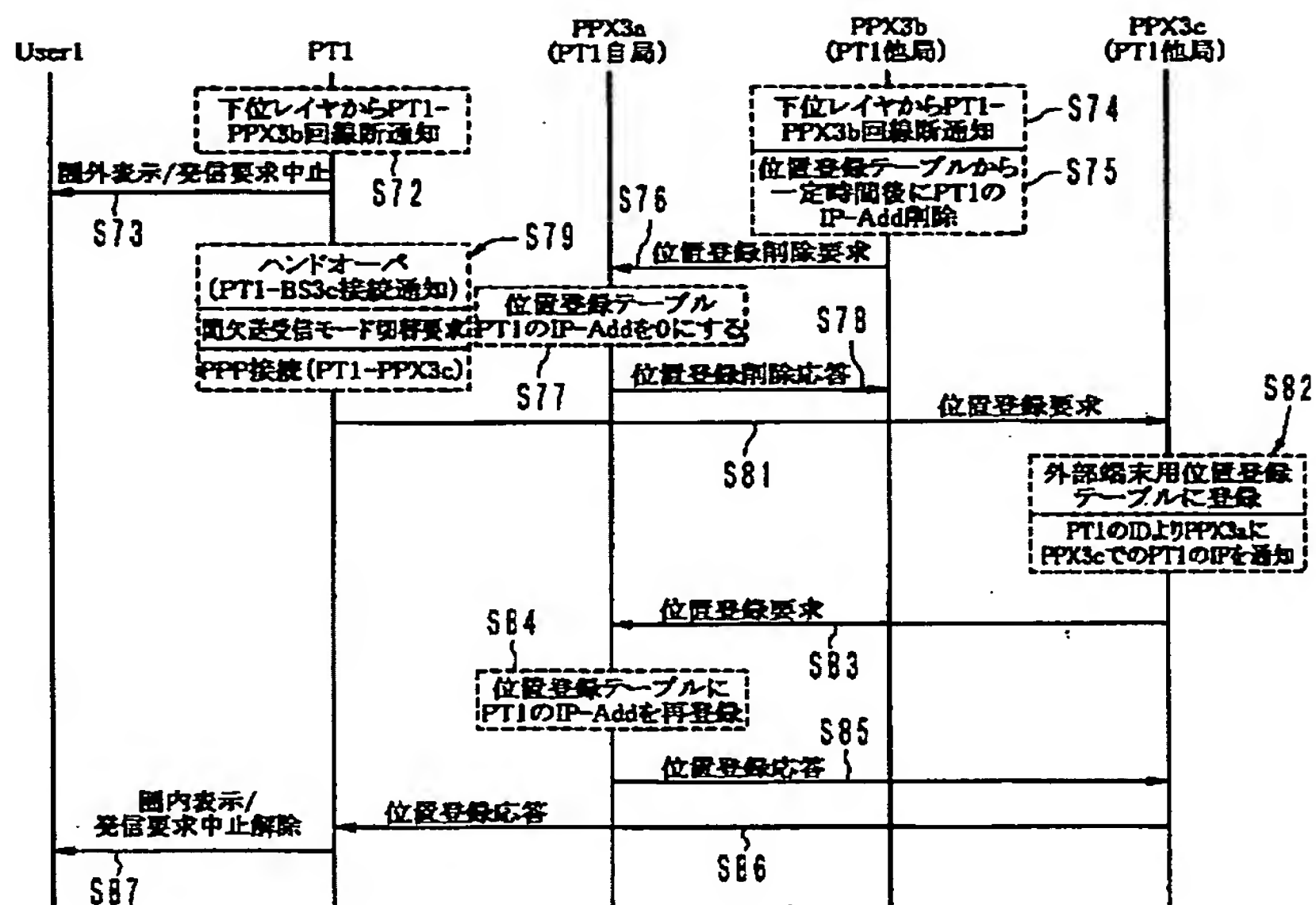
【図5】



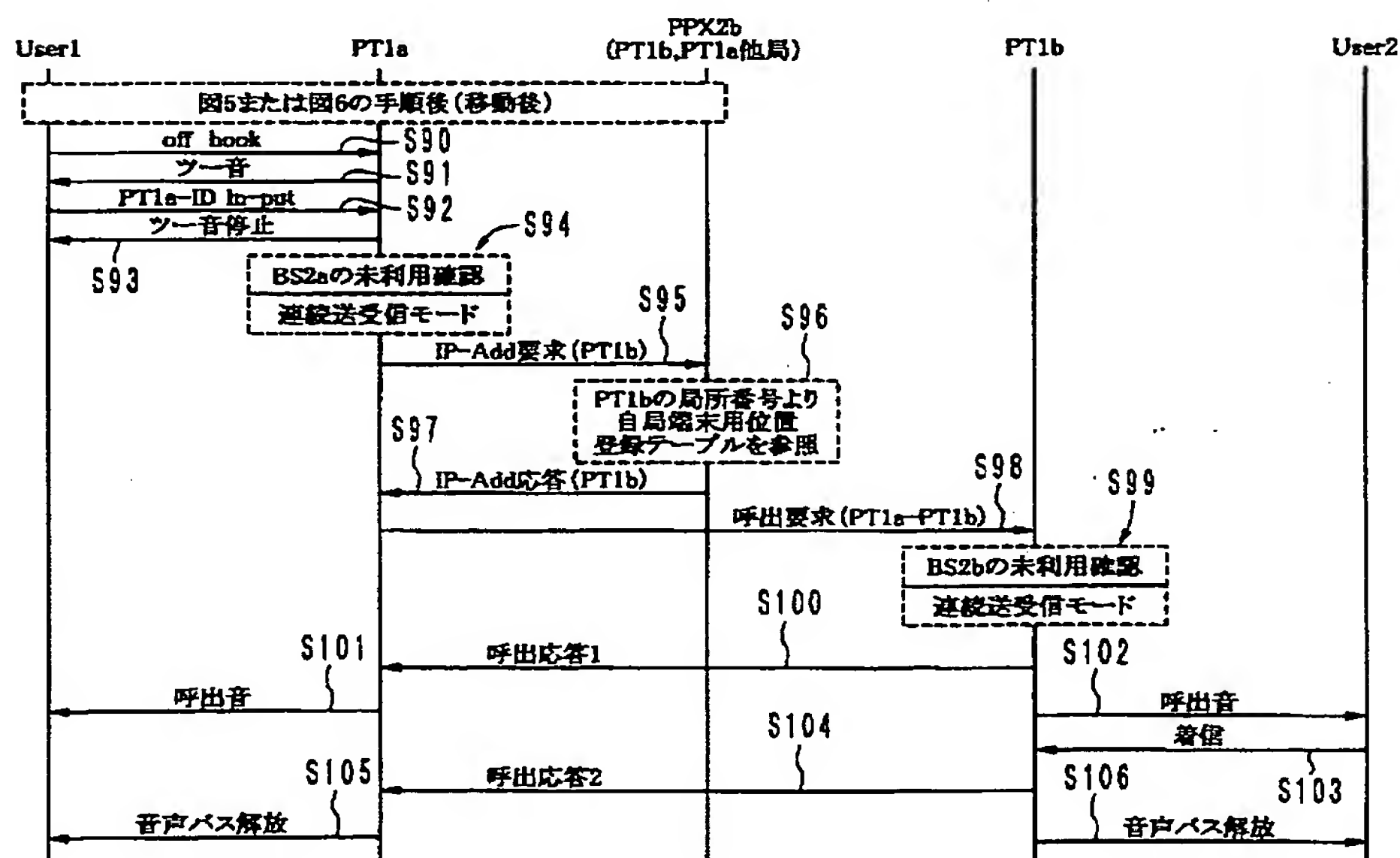
【図6】



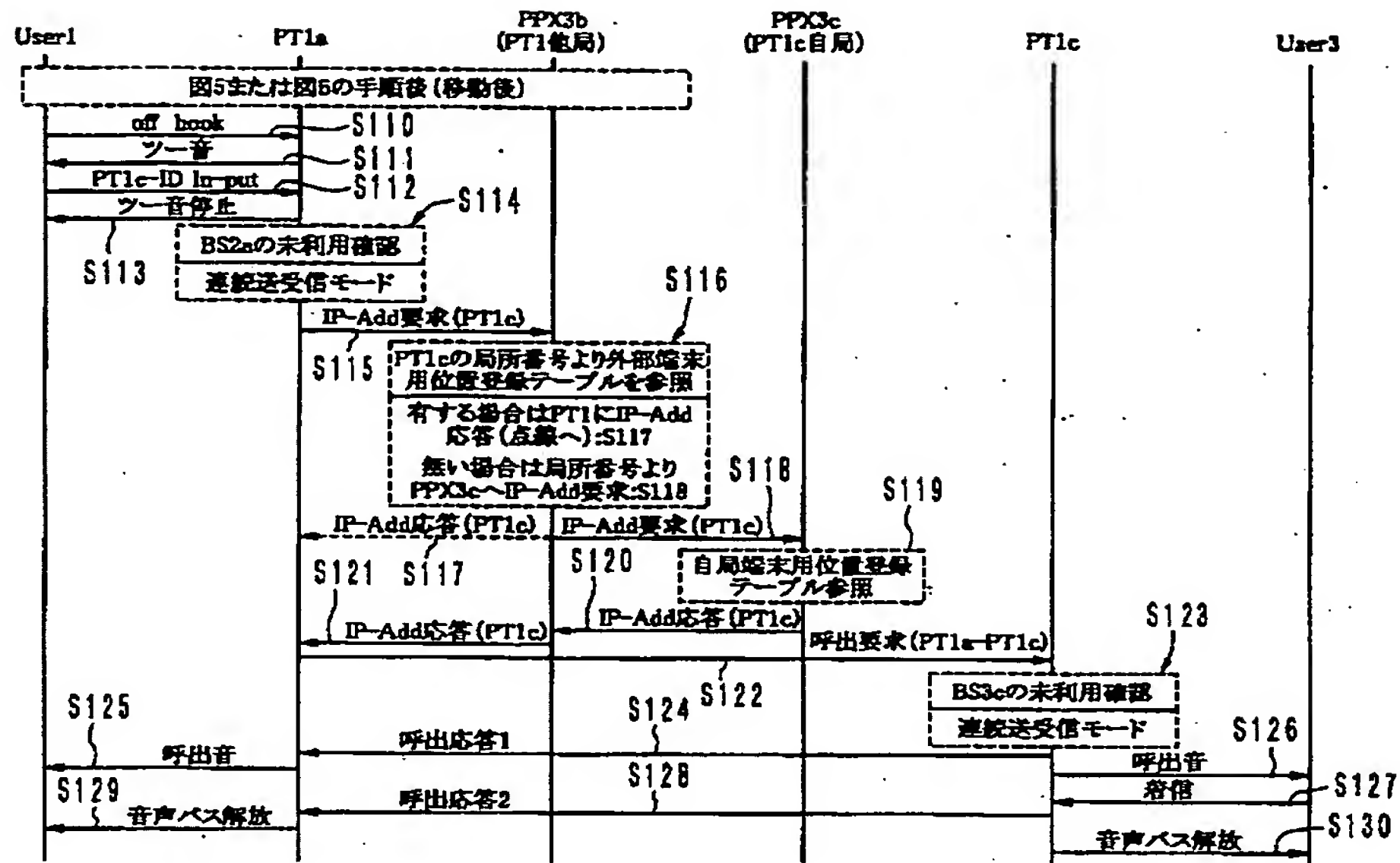
【図7】



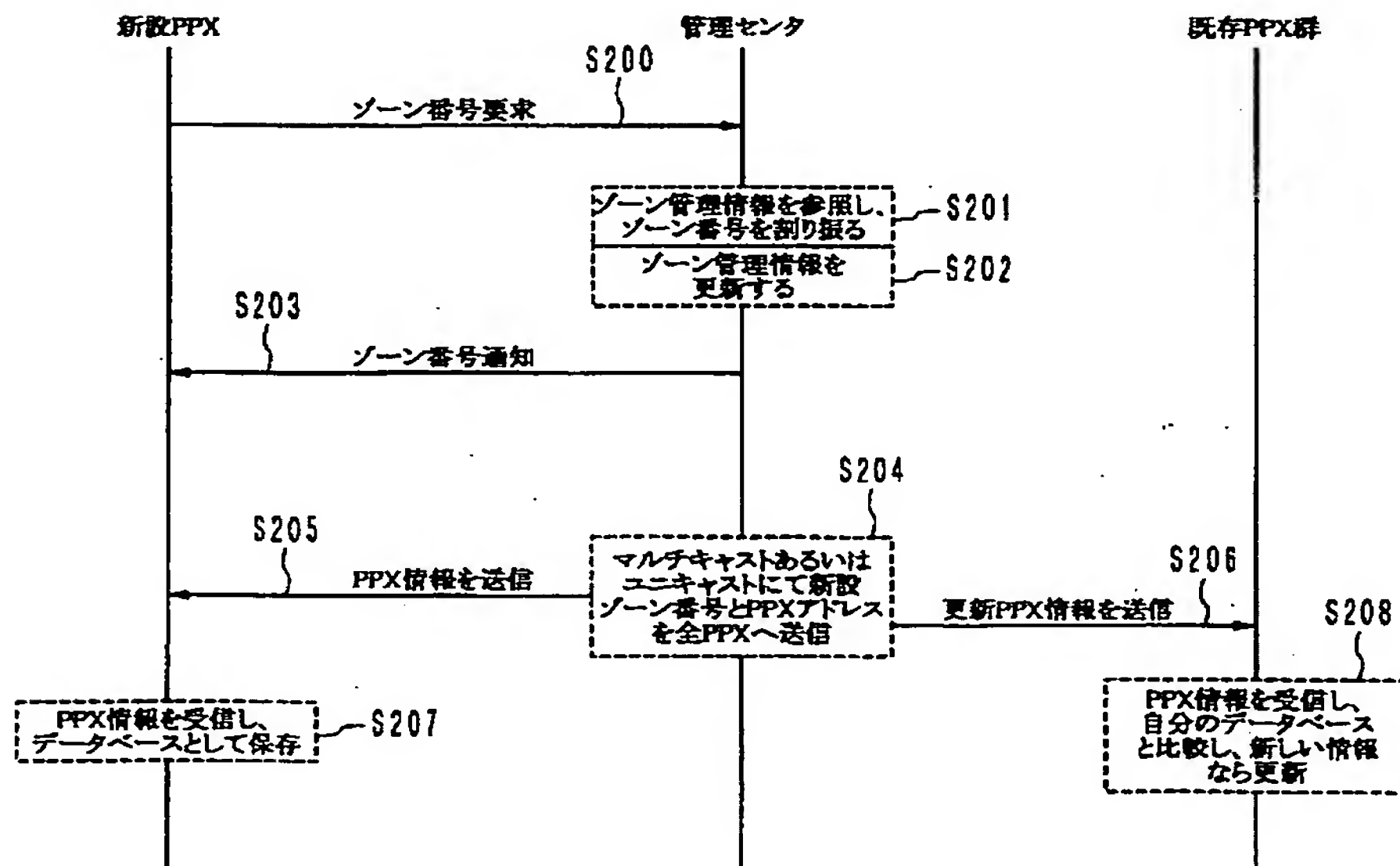
【図8】



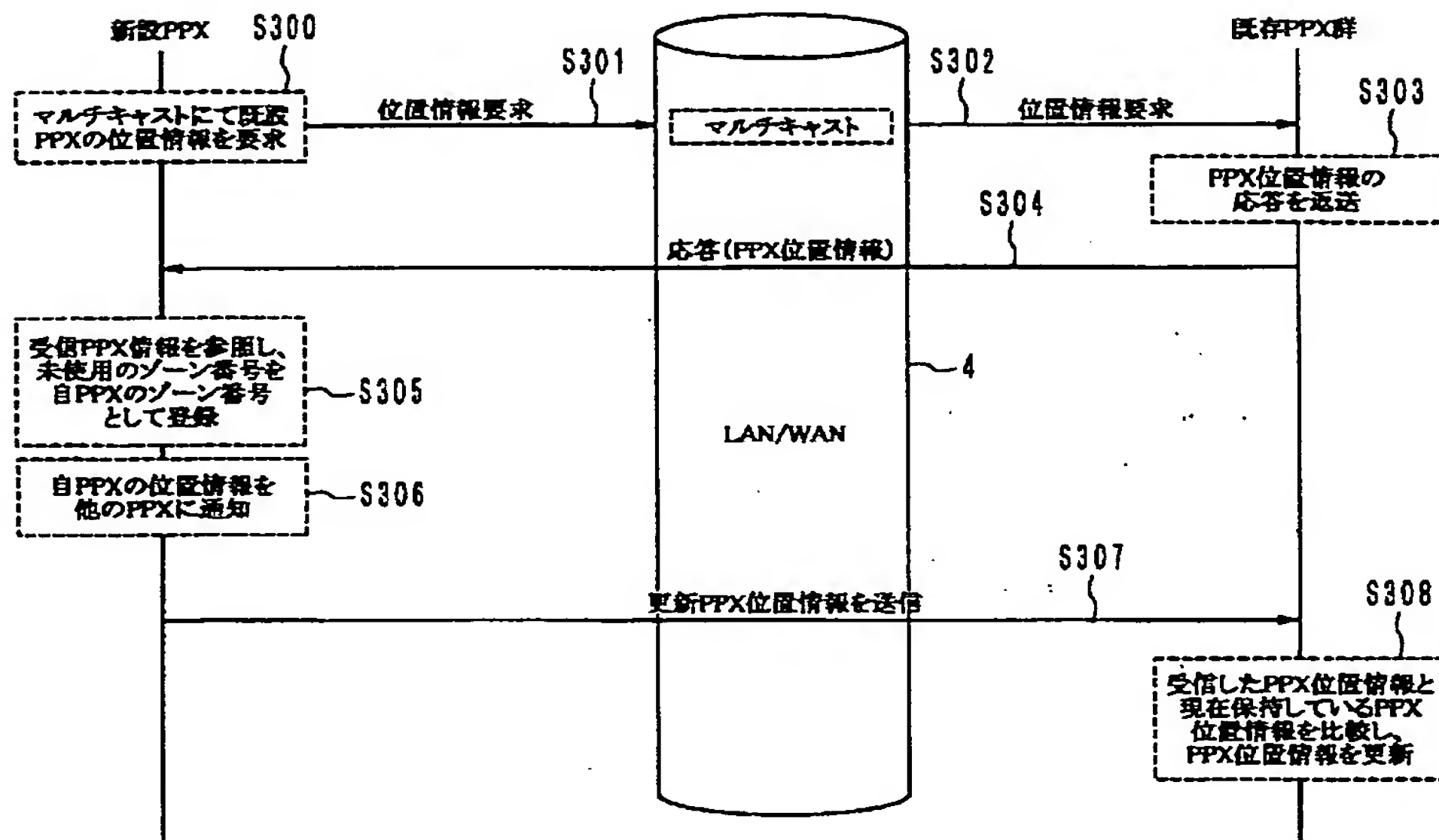
【図9】



【図10】



【図11】



フロントページの続き

(51) Int. Cl. 7

識別記号

F I

テーマコード (参考)

H 0 4 B 7/26

1 0 6 A

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F ターム (参考) 5K024 CC11 GG10 GG13

5K030 GA05 HA08 HB01 HC01 HC14
HD09 JL01 JT01 KA05 LB015K033 AA04 BA14 CB01 CB08 DA05
DA19 DB12 DB14 DB16 DB18
EC045K067 AA33 AA42 BB08 CC08 CC14
DD17 DD53 EE02 EE10 EE16
GG01 HH23 JJ52 JJ54

5K101 LL05 LL14